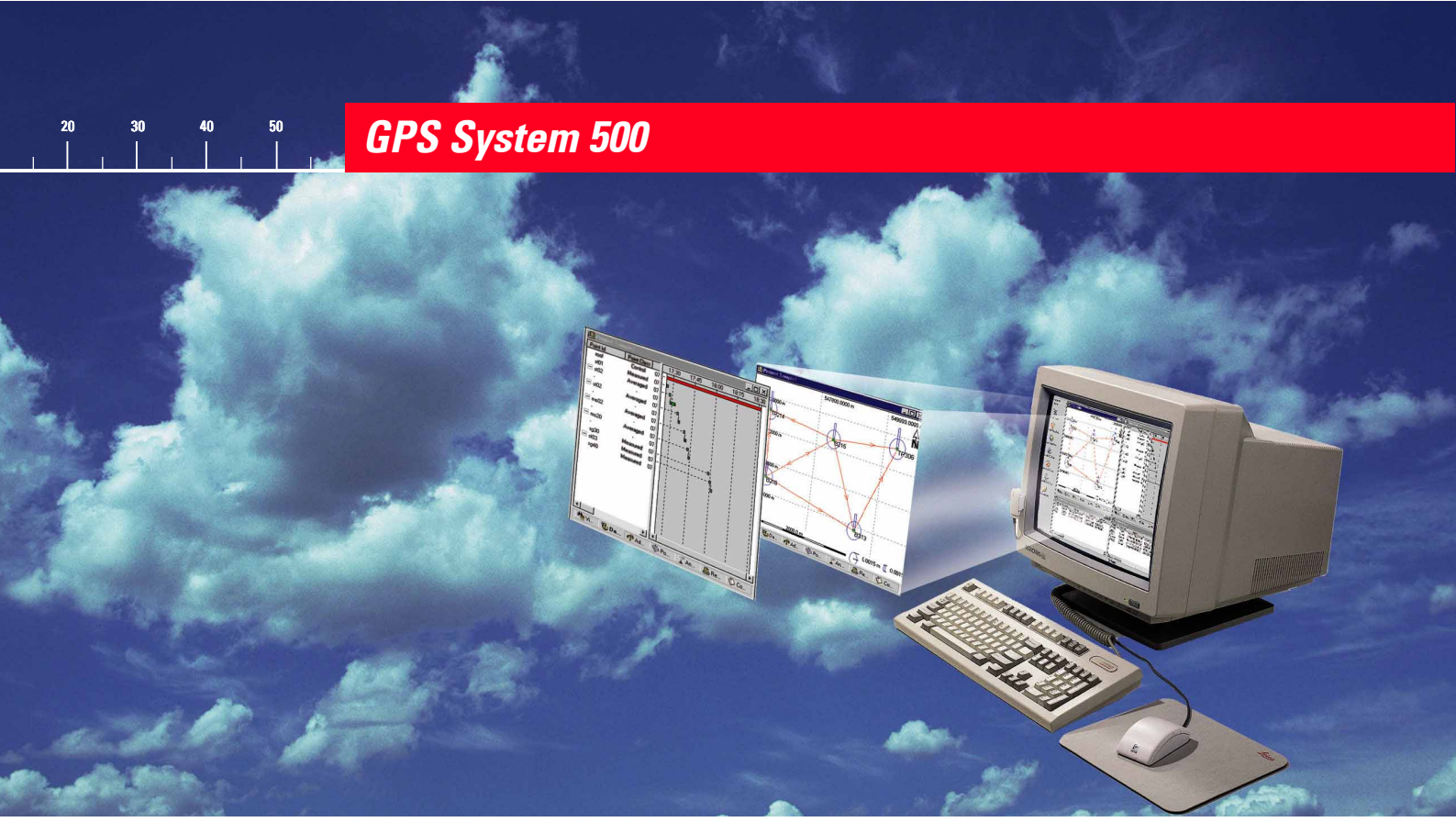
GPS System 500



User Manual / Getting Started with SKI-Pro

Version 3.0
English

Leica Geosystems

Congratulations on your purchase of Leica SKI-Pro Software

In order to use this software correctly and reliably, you must follow the instructions given in this user manual and/or in the on-line help system. You must also adhere to the directions given in the user manual for the product with which you are using the software.
The rights and responsibilities accruing in respect to Leica as a result of acquisition of the software are set out in the **Leica Software Licence Agreement**.

All of the instructions and directions required for technical specialist to use the software are included in this user manual, which is only available in certain languages.

Product Identification

The software version of your copy of SKI-Pro is written on the CD-ROM label. The License Number is given on the SKI-Pro Software Licence Agreement. Enter the software version and licence number in the spaces provided below and always refer to this information when you need to contact agency or authorized service workshop.

Software Version: _____

Language: _____

Licence Number: _____

Technical Support

Technical Support is provided by Leica Geosystems worldwide network of representatives. We are represented in almost every country in the world. A representative directory is available at:

www.leica-geosystems.com

Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

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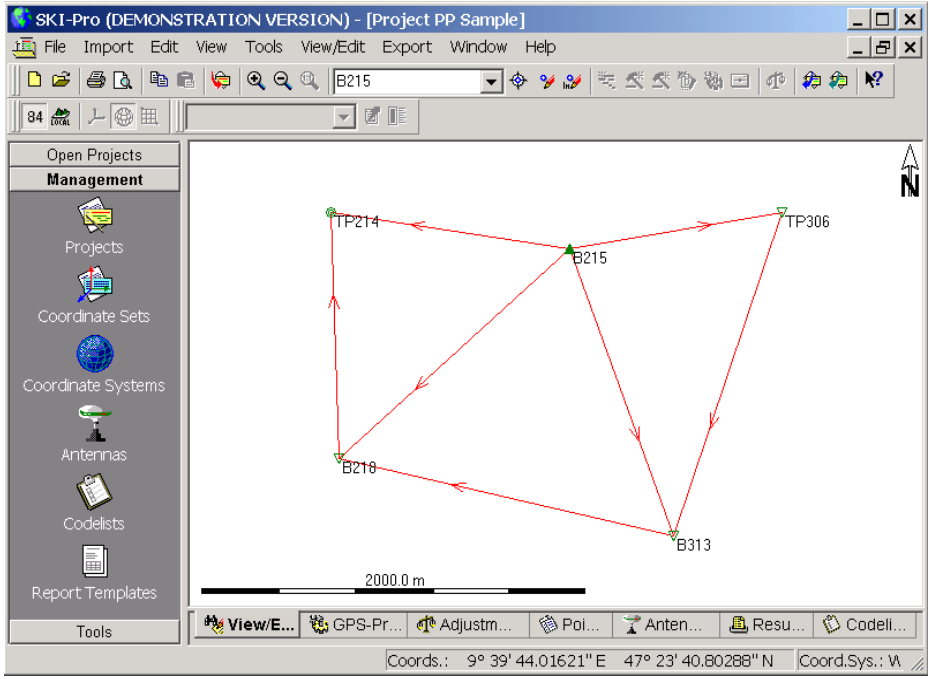
Welcome to SKI-Pro, **S**tatic-**KI**nematic-**Pro**fessional GPS software for post-processing and management of GPS data. SKI-Pro is the complete GPS office software package that accompanies Leica GPS System 500 Hardware.

What is SKI-Pro

Leica's SKI-Pro software is a comprehensive, automated suite of programs for GPS surveying including post-processing and support of real-time measurements.

It's functionality includes:

- Data import
- Data management
- Data processing
- Network adjustment
- Datum transformation
- Data export



SKI-Pro user interface (graphical view)

Licence Agreement and Support

Read the Software License agreement carefully before opening the package containing the installation CD-ROM.

Software Protection

Part of SKI-Pro is not protected and may be used without the software protection key (dongle). The unprotected part contains:

- Satellite Availability
- Data Import
- RINEX Export
- ASCII Import / Export
- Project Management
- Coordinate Set Management
- Coordinate System Management
- View and Edit
- Codelist Management
- Antenna Management
- Data Exchange Manager
- Software Upload

Software Protection, continued

The protected options are available individually and can be accessed by using the software protection key only. The protected options are:

- GPS-Processing
- Datum and Map
- Adjustment
- RINEX Import
- GIS / CAD Export

If you are installing SKI-Pro all options will be installed automatically but the protected options are accessible only if the software protection key is connected to the parallel port of the computer and if the purchased options have been activated on the protection key.

Installation

Installing SKI-Pro is a simple process. This brief chapter explains everything you need to know regarding installation.

System requirements:

The computer and system software you intend to use with SKI-Pro must meet the following minimum requirements. Note that SKI-Pro works best with the recommended requirements.

The operating system must be one of the following:

Windows 98, Windows 2000, Windows NT 4.0 (or later), Windows ME or Windows XP.

Internet Explorer 4.0 or higher is required.

Minimum Hardware requirements:

- PC with Pentium processor 133 Mhz
- 32 MB RAM
- 100 MB free space on harddisk (for typical installation)
- RS232 COM port
- Parallel Port (for software protection key)
- CD-ROM drive
- Mouse installed

Recommended Hardware requirements:

- PC with Pentium processor 500 Mhz or faster
- 128 MB RAM
- 300 MB free space on harddisk
- RS232 COM port
- Parallel Port (for software protection key)
- CD-ROM drive
- Mouse installed

Before you install:

Ensure that your computer and software conform to at least the minimum requirements as outlined above.

SKI-Pro requires at least 100 MB of free disk space. The programs on the installation CD are compressed and will be expanded during installation.

Under Windows 2000 or Windows XP SKI-Pro can only be installed successfully if the user is logged in as Administrator.

SKI-Pro is delivered on a CD-ROM. If you do not have a CD-ROM drive you can order the installation on floppy diskettes separately.

To install SKI-Pro from CD-ROM:

➢Insert the CD-ROM labelled “GPS System 500SW”. The install shield will start automatically and guide you through the installation process.

During the installation you are given the following option to install: **Typical** or **Compact**. If you choose *Typical* all components including the optional components will be installed. This option is recommended in most cases. Choose *Compact* only if you are always using SKI-Pro without the software protection key (dongle) and want to save diskspace.

Older version of SKI-Pro already installed

If you have an older version of SKI-Pro already installed on your computer all database information such as Projects, Coordinates Sets and Coordinate Systems will be updated automatically.

Database information from SKI 2.3 or earlier will NOT be updated automatically. To update SKI 2.3 (or earlier) Projects you can either re-import raw data and process them again or you can import final coordinates or baselines via SKI ASCII files.

Uninstall SKI-Pro

Do not delete any program files manually by using Windows Explorer or any other File Management program.

To delete the SKI-Pro installation on your computer follow the instruction below:

- From the Windows™ **Start** bar, click **Programs**.
- Select SKI-Pro.
- Click **Uninstall Leica SKI-Pro**.
- Confirm with **Yes**. All SKI-Pro files and settings will be removed permanently from the harddisk.

Starting and exiting SKI-Pro

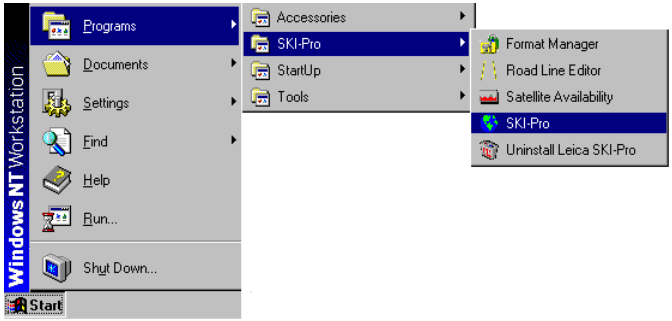
To start SKI-Pro:

➢ Ensure that the green software protection key (dongle) is inserted into the parallel port of your computer.

➢ From the Windows™ **Start** bar, click **Programs**.

➢ Select **SKI-Pro**.

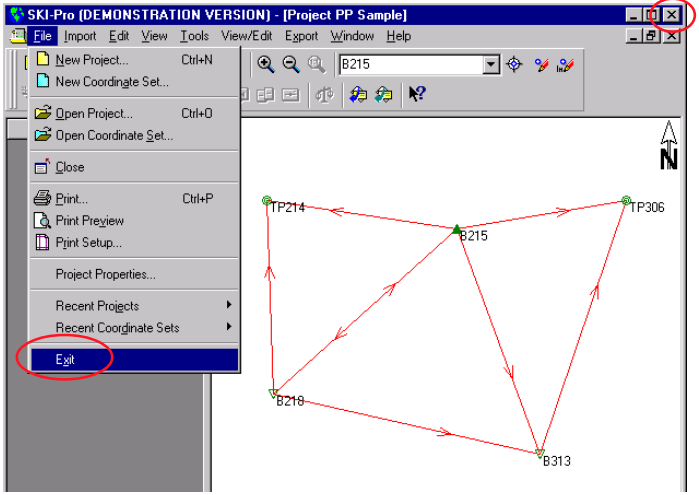
➢ Click **SKI-Pro**.



Under Windows 2000 or Windows XP SKI-Pro can only be started successfully if the user belongs to the Administrator or Power User group.

To exit SKI-Pro:

➢ From the **File** menu click **Exit** or click on the ✕ icon of the SKI-Pro main window.



An Overview of SKI-Pro

SKI-Pro runs on 32-bit Microsoft® Windows™ 98, 2000, NT, ME or XP platforms. As SKI-Pro software is based on an intuitive graphical interface with standard Windows™ operating procedures, it is remarkably easy to learn and use. All components have a uniform appearance and interact instantly and seamlessly with each other in a multi-tasking software environment.

Those who are already familiar with Windows™ will find SKI-Pro very easy to handle. Those with no prior knowledge of Windows™ will find it quick and easy to learn.

SKI-Pro components

SKI-Pro consist of several components:

- **Project Management**
- **Coordinate Set Management**
- **Coordinate System Management**
- **Antenna Management**
- **Codelist Management**
- **Data Exchange Manager**
- **Software Upload**
- **Raw Data Import**
- **ASCII Import**
- **ASCII Export**
- **RINEX Export**
- **GIS/CAD Export***
- **Datum and Map***
- **GPS-Processing***
- **Adjustment***
- **RINEX Import***

*Some of these components are delivered as options which gives the user the opportunity to select the combination which best suits his or her needs and budget. Refer to chapter 1.2 Software Protection for more information.

The following external programs cannot be accessed from within SKI-Pro but are installed automatically with SKI-Pro:

- **Satellite Availability**
- **Road Line Editor**
- **Format Manager**

These programs are not explained in this manual. Please refer to the corresponding Manuals or Help Systems of the programs for more information.

Project Management

All GPS data that is collected and that belongs together can be organized in SKI-Pro within a single Project. This Project could contain, for example, all data relating to a particular contract you are carrying out for a client.

In the Project Management you can create, open, and edit projects as well as register projects not contained in the project list. The Project Management can also be used to attach and modify Coordinate Systems.

Never delete a project or any of the files contained within a project from outside SKI-Pro. **Always** use the Project Management to delete unwanted projects. Deletion of projects or project files from outside of SKI-Pro can result in the destruction of the consistency of the database, which will lead to unrecoverable database errors.

Coordinate Set Management

The Coordinate Set Management manages Coordinate Sets that are stored in the SKI-Pro database.

A Coordinate Set is a list of point coordinates that are stored independently from Projects. A Coordinate System may be assigned to a Coordinate Set, allowing you to switch between Cartesian, Geodetic and Grid coordinates.

Points can be added either manually, by importing via ASCII file or by dragging from an existing Project.

A Coordinate Set can either hold WGS84 or Local Coordinates but does not allow to switch between them.

Coordinate System Management

A coordinate system provides the information necessary to convert coordinates to different representations (Cartesian, Geodetic or Grid) and to transform coordinates between the WGS84 and the Local System. A Coordinate System may be attached to a Coordinate Set or to a Project.

Within SKI-Pro the user can work in the global system (WGS84) or in a local coordinate system. The local coordinate system may be a geodetically defined system or it may be a simple grid system with neither an ellipsoid nor a projection associated with it.

The Coordinate System Management is linked to a database that stores the parameters. This database is independent from the project database.

Antenna Management

The Antenna Management allows you to define and edit parameters for different GPS antennas. This information is stored in a global database and can be used to upload to the Sensor or in a Project for GPS-Processing. All Leica antennas are pre-defined upon installing the software and the user is not permitted to make any changes to these pre-defined antennas.

Codelist Management

A Codelist contains Thematical or Free Coding information that may be assigned to points during measurement in the field. A Codelist may be attached to a Project.

The Codelist Manager enables you to create and edit Codelists for later use in the field.

Data Exchange Manager

The Data Exchange Manager component allows you to transfer data from and to the instrument. Data can be downloaded or uploaded directly onto a PCMCIA card or via serial communication.

All SKI-Pro database objects (e.g. Projects, Coordinate Systems etc.) can be transferred and will be converted to the data structure of the instrument if required. Up- and download of single files is also possible.

Software Upload

The Software Upload tool enables you to load Sensor/System firmware or other software (Terminal firmware, Language files, Configuration files or Character sets) onto the instrument via serial communication. Throughout the software upload procedure you are guided by the Sofware Installation wizard.

Raw Data Import

The Raw Data Import component enables you to import GPS field data into SKI-Pro.

It is possible to transfer GPS raw observations for post-processing along with related point information as well as coordinates recorded in Real-Time into Projects or Coordinate Sets.

GPS raw observations may be in Leica System 200, 300 or 500 format. Optionally GPS raw observations may be imported in RINEX format. See also RINEX Import.

It is also possible to import coordinate files in ASCII format into Projects or Coordinate Sets.

Additionally, there is the facility to import Precise Ephemeris data.

ASCII Import

The ASCII Import component enables you to import coordinates and baselines from pre-defined or user-defined files.

You may import pre-defined files of Leica standard format SKI-ASCII or IDEX (InDependent EXchange format).

An import wizard allows to define unknown file formats and enables you to import any kind of user-defined coordinate files.

ASCII Export

The Export component enables you to export data from SKI-Pro.

Coordinate information may be exported to ASCII files in various pre-defined or user-defined formats.

See also GIS/CAD Export option.

RINEX Export

The RINEX Export enables you to export GPS raw observations to an ASCII file in RINEX format. Unlike the RINEX Import this function is not an option and is available as standard.

GIS/CAD Export (optional)

The GIS/CAD Export is an optional Export tool. It enables you to write the point coordinates to AutoCAD (DXF/DWG), MicroStation (DGN) or MapInfo (MIF) formatted files.

Datum and Map (optional)

If the user requires final coordinate output in the coordinate system to which the GPS measurements are related (WGS84) then this optional tool is not necessary. However, in most cases it is necessary to transform the WGS84 coordinates into a local coordinate system.

The Datum and Map option provides you with a tool to determine transformation parameters which can then be used to perform datum transformations within two sets of coordinates.

GPS-Processing (optional)

The GPS-Processing is an option that can be accessed via the GPS-proc Tab from within a Project window. It allows you to process GPS observations that have been recorded in the field to achieve WGS84 coordinates and their relative accuracy.

Static, Rapid-Static, Stop and Go, Kinematic, Kinematic on the Fly, and Single-Point data can be processed.

The data to be processed may be selected graphically. The computation itself is completely hidden for the user. All selected data is processed automatically in a batch process without the need for any user interaction.

After the GPS-Processing is completed the results can be viewed and stored for further use in the Results-View.

Adjustment (optional)

Adjustment is an option that can be accessed via the Adjustment Tab from within a Project window. It provides you with a powerful tool for performing a least squares adjustment on a network of baseline vectors and terrestrial data (directions, distances, vertical angles, azimuths and height differences).

Additionally it enables you to perform a network simulation based upon default observation precisions to find out how good the design of your network is before you measure.

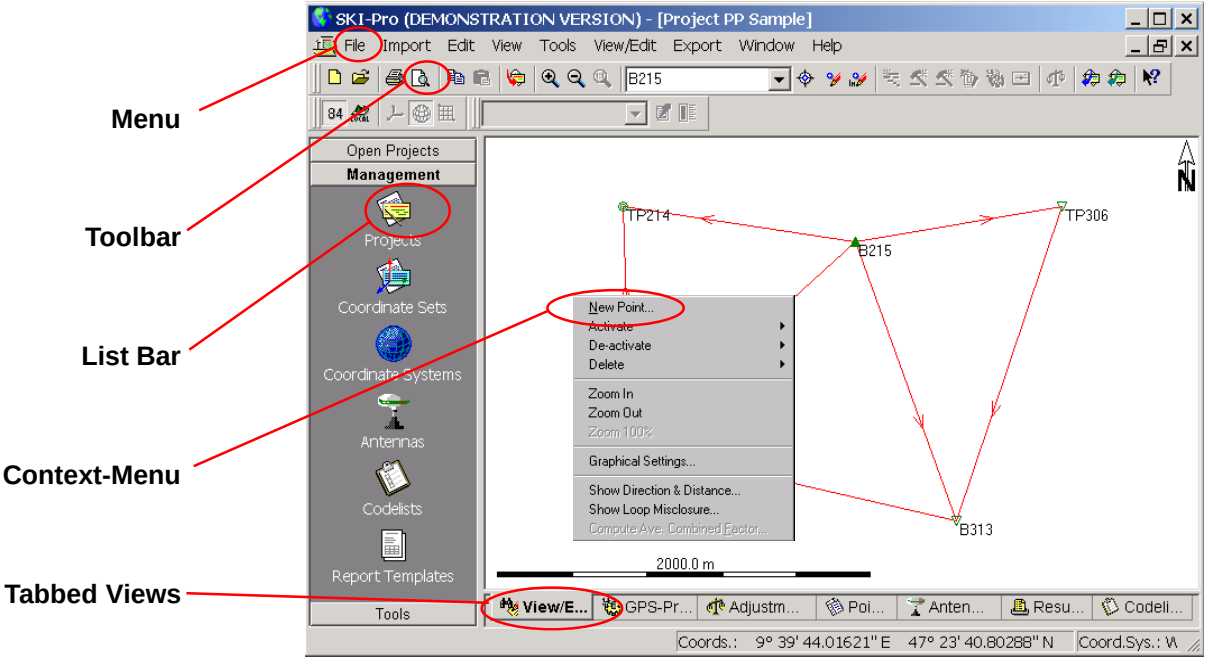
A graphical user interface similar to that of View/Edit allows you to select the points and observations to be adjusted.

RINEX Import (optional)

RINEX Import is the optional part of the data Import tool. It enables you to import GPS observation data collected with third party receivers in RINEX (Receiver INdependent EXchange) format.

Software Navigation Tools

The various components of SKI-Pro may be accessed using different methods. In order to navigate through the software you may choose the tools which you prefer:



Menu Bar

The Menu Bar is a special Toolbar at the top of the screen that contains menus such as File, Edit and View. The Menu Bar lists the available commands. If a command is not applicable it is greyed out and not accessible.

Toolbar

Toolbars allow you to organize the commands you use most often the way you want to, so you can find and use them quickly. You can easily customize toolbars - for example, you can add and remove buttons, create your own custom toolbars, hide or display toolbars, and move toolbars.

List Bar

The List Bar gives you single-click access to all available components and tools of SKI-Pro. Additionally if a Project or a Coordinate Set is open it lists them. Therefore the List Bar allows you to simply switch between a tool and/or a Project or Coordinate Set.

You can display small or large icons or hide the List Bar.

The List Bar is divided into groups (folders) to help organize your information. Click a folder, e.g. Management, to move to a different set of tasks.

Context Menu

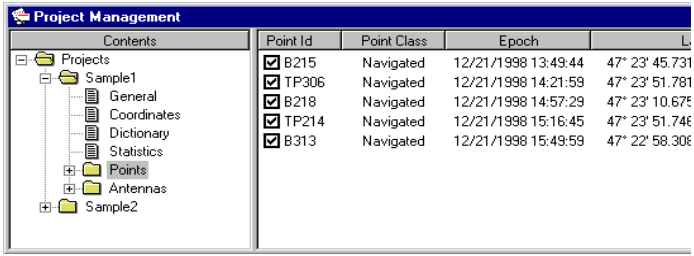
Almost everywhere upon right-click on a particular item in SKI-Pro a Context-Menu is available. A Context-Menu lists all useful commands at a particular instant for a particular item on the screen. It is possible to navigate through the entire software by only using commands from the Context-Menu.

Tabbed-View

Upon opening a Project, tabs at the bottom of the view allow you to quickly switch from one view to another. You may instantly switch from, for example, a Graphical View (View/Edit) to the Points View or GPS-processing View.

Explorer-View

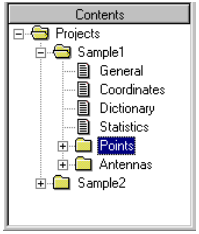
Throughout SKI-Pro a powerful Explorer-View is utilized to list information, be it database information or results from calculations. This view which has similar functionality as the Windows™ Explorer view normally consists of two panes. A **Tree-View** on the left-hand side and a **Report-View** or **Property-View** to the right hand side. Listed data may be easily arranged, sorted, selected and even printed.



Explorer-View

Tree-View

The Tree-View pane provides you with an overview of the items you are currently working with, in an expandable/collapsible hierarchy of folders and pages .



Tree-View

Double-click on a folder or click ⊞ to expand (open) it.

If a folder is open double-click on it or click ⊟ to collapse (close) it.

Click on a folder or page to display the content of it. Depending on the type of data to be displayed the data will be listed in a **Report-View** or **Property-View**.

Report-View

Database information such as e.g. Points or Observations may be listed in a Report View.

Point Id	Point Class	Epoch	Latitude	Longitude	Height
B215	Navigated	12/21/1998 13:49:45	47° 23' 45.73110" N	9° 38' 10.52060" E	448.1217
TP306	Navigated	12/21/1998 14:22:00	47° 23' 51.78132" N	9° 39' 04.09567" E	461.0808
B218	Navigated	12/21/1998 14:57:30	47° 23' 10.67503" N	9° 37' 13.65965" E	432.3451
TP214	Navigated	12/21/1998 15:16:45	47° 23' 51.74697" N	9° 37' 12.30504" E	416.3859
B313	Navigated	12/21/1998 15:50:00	47° 22' 58.30884" N	9° 38' 36.75722" E	449.8015

Report-View

The data records are listed in rows and columns. Each row displays one record.

The columns are fully user configurable. You can change the width, sort the records according to columns or view and hide individuals columns.

Certain data items may be modified by simply double-click on them.

Property-View

Database information such as e.g. Project Properties may be listed in a Property-View:

Property	Value
Name	Sample1
Location	C:\SKIPro\Data\Projects\Sample1\
Date Created	05/30/2000 13:55:55
Last Used	05/30/2000 13:56:03
Avg. Limit Pos.	0.0750
Avg. Limit Hgt.	0.0750
Coordinate System	WGS 1984
Compute Mod. Grid Coordinates	No
Avg. Combined Factor	1.0000
Northing Shift	0.0000
Easting Shift	0.0000
Time Zone	1h00'
Manager	
Client	
Street	
Map Reference	
Print Header	
Print Footer	
Note	

Property-View

The information is listed in two colums. The first column lists the description (Property) and the second column lists the actual value.

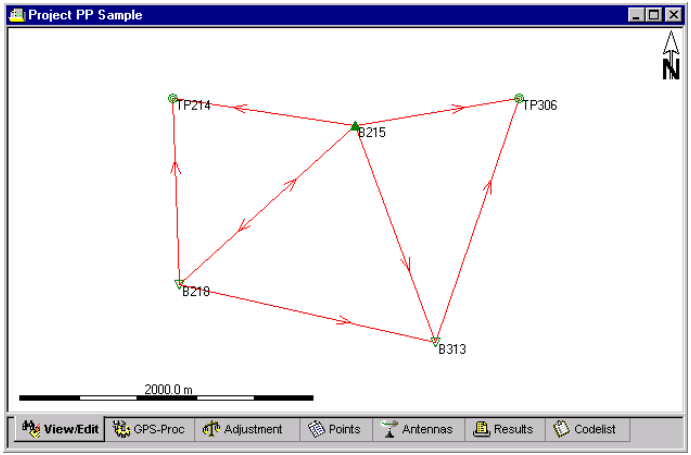
Property-Views are not user configurable.

Graphical-View

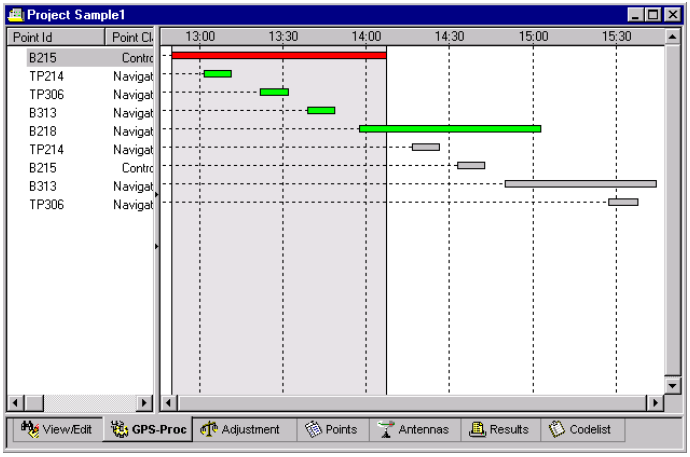
The data contained within a Project may not only be viewed and edited using the Report-View but also using a graphical user interface. Two types of Graphical-Views may be utilised. Points and Baselines are displayed in a map-view while observation data is displayed in a combined Report /Graphical-View.

Both views enable you to select and modify data, zoom in, zoom out and even print the view.

To switch between the different views of a Project simply click on the tabs below the view.



Graphical-View of View/Edit or Adjustment



Graphical-View of GPS-Processing

Accessing the On-line Help

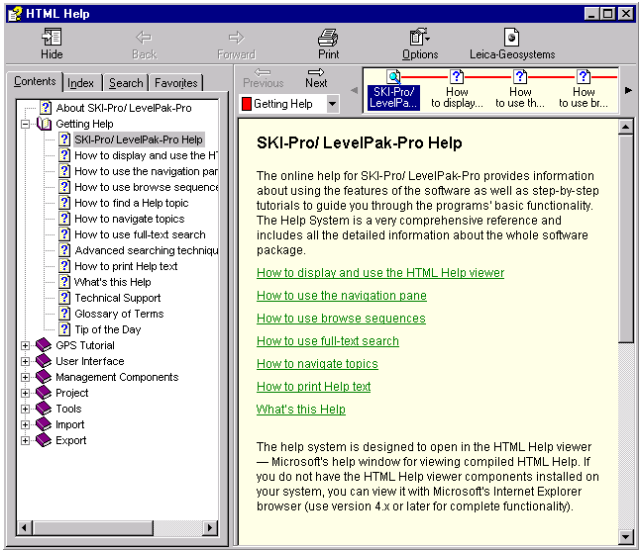
The SKI-Pro On-line Help System is a very comprehensive reference and includes all the detailed information about the whole software package.

Any Information NOT contained in this user manual can be found in the On-line Help System.

To display the On-line Help System:

➢From the **Help** menu click **Contents and Index**.

The Help Topics property sheet appears:


HTML Help
Hide
Back
Forward
Print
Options
Leica-Geosystems
Contents
Index
Search
Favorites
Previous
Next
Getting Help
SKI-Pro/ LevelPa...
How to display...
How to use th...
How to use br...
About SKI-Pro/ LevelPak-Pro
Getting Help
SKI-Pro/ LevelPak-Pro Help
How to display and use the H
How to use the navigation par
How to use browse sequence
How to find a Help topic
How to navigate topics
How to use full-text search
Advanced searching techniqu
How to print Help text
What's this Help
Technical Support
Glossary of Terms
Tip of the Day
GPS Tutorial
User Interface
Management Components
Project
Tools
Import
Export
SKI-Pro/ LevelPak-Pro Help
The online help for SKI-Pro/ LevelPak-Pro provides information about using the features of the software as well as step-by-step tutorials to guide you through the programs' basic functionality. The Help System is a very comprehensive reference and includes all the detailed information about the whole software package.
How to display and use the HTML Help viewer
How to use the navigation pane
How to use browse sequences
How to use full-text search
How to navigate topics
How to print Help text
What's this Help
The help system is designed to open in the HTML Help viewer — Microsoft's help window for viewing compiled HTML Help. If you do not have the HTML Help viewer components installed on your system, you can view it with Microsoft's Internet Explorer browser (use version 4.x or later for complete functionality).

All topics contained in the Help are listed in books and pages .

➢Double-click on a book to open it .

A book may contain pages or other books .

➢Click on a page to open the help text.

To find a topic in the Help:

➢Click the **Contents** tab to browse through topics by category.

➢or click the **Index** tab to see a list of index entries: either type the word you're looking for or scroll through the list.

➢or click the **Search** tab to search for words or phrases that may be contained in a Help topic.

➢or click the **Favorites** tab to quickly display a topic that you have collected in your personal list of frequently opened topics .

To print Help text:

➢If the Contents tab isn't already displayed, click on **Contents**.

➢Select the book or the page that you want to print.

➢Click on the **Print** button.

➢Make sure the printer information is correct.

➢Select **OK** to confirm.

What's this Help:

Help topics may also be accessed via the controls and commands from the SKI-Pro user interface:

➢Click the icon from the Toolbar and click on another Toolbar or List Bar icon or select a command from the menu to open the appropriate help topics.

Alternatively select "**What's This?**" from the **Help** menu or press **F1** to get help on the currently active component.

Glossary of terms:

If you do not understand a particular term used in the software refer to the Glossary of terms contained in the On-line Help System.

➢If the Contents tab isn't already displayed, click on **Contents**.

➢Double-click the **Getting Help** book.

➢Click the **Glossary of Terms** page and click on the desired term in the list.

For more information on the Help System refer to the **Getting Help** chapter (book) in SKI-Pro's On-line Help.

Quick Tour I - Real Time

This Quick Tour is a step-by-step tutorial in which you learn how to work with real time GPS data. When using real time the processing and the applying of coordinate systems is already done in the field, so that the office work is reduced to importing raw data, eventually checking the results and directly exporting the final grid coordinates.

This exercise does NOT need your green software protection dongle to be connected.

The exercise comprises of the following scenario:

A number of real time points have been measured. Two different reference stations have been used. The points BM1 to BM4 have been measured from both reference stations, all other points from either reference station TP306 or from reference station B215. The raw data is given in the directory:

...\SkiPro\Data\SampleData\Sys500\Realtime.

A local coordinate system has been used in the field, which comprises of a *UTM Zone 32 North* Projection on the *Bessel* Ellipsoid and a Classical 3D Transformation called *"Sample WGS-Bess"*.

This Quick Tour comprises of the following steps:

Lesson One

- ☐ Importing GPS raw data and the attached coordinate system
- ☐ Creating the RealTime Fieldbook report
- ☐ Creating a Project

Lesson Two

- ☐ Exploring the View/Edit component

Lesson Three

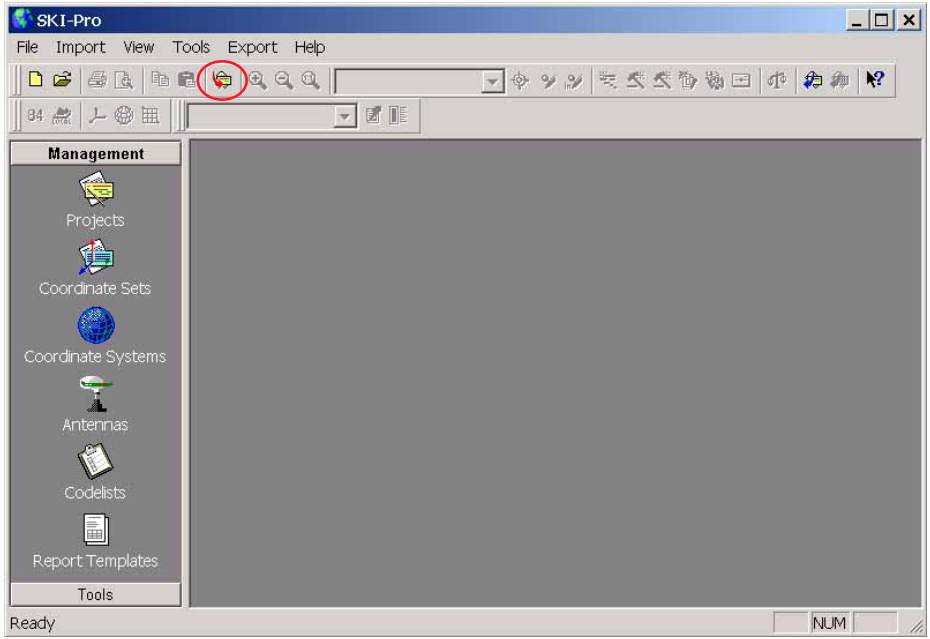
- ☐ Exporting coordinates to a customized ASCII file

In Lesson One you will learn how to import GPS raw data and at the same time create a new Project.

Start-up SKI-Pro:

➢From the **Start** menu select **Programs**, **SKI-Pro** and then click on **SKI-Pro**.

The main SKI-Pro window appears.

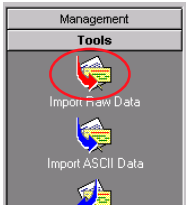


➢From the **Import** menu or Toolbar select

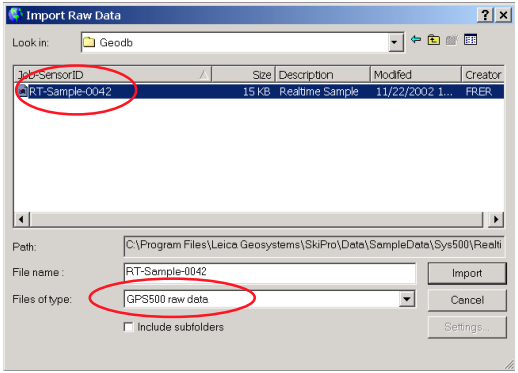
GPS Raw Data .

or

➢from the **Tools** List Bar select **Import GPS Raw Data**



The following dialog appears:



➢Under **Files of type:** select **GPS500 raw data**.

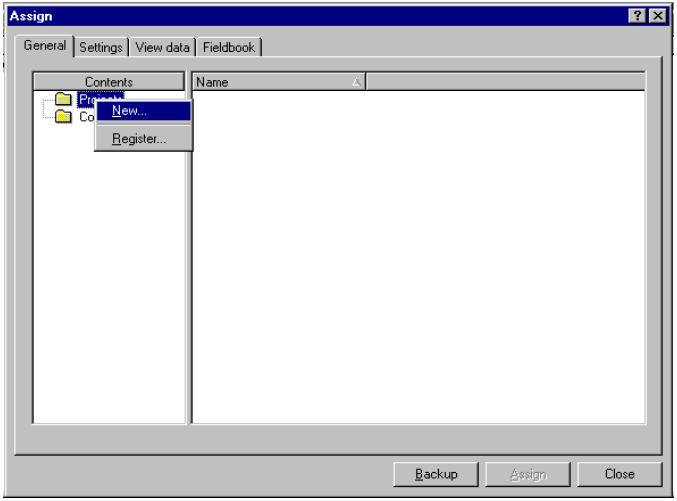
➢Under **Look in:** select the directory that contains the sample data:
*...\SkiPro\Data\SampleData\Sys500**Realtime\Data\Geodb***

Depending where you installed SKI-Pro the path for the sample data may vary slightly. By default SKI-Pro will be installed in:
C:\Program Files\Leica Geosystems\...

➢From the browser select the job ***RT-Sample***

➢Click **Import**.

The following Property Sheet appears:

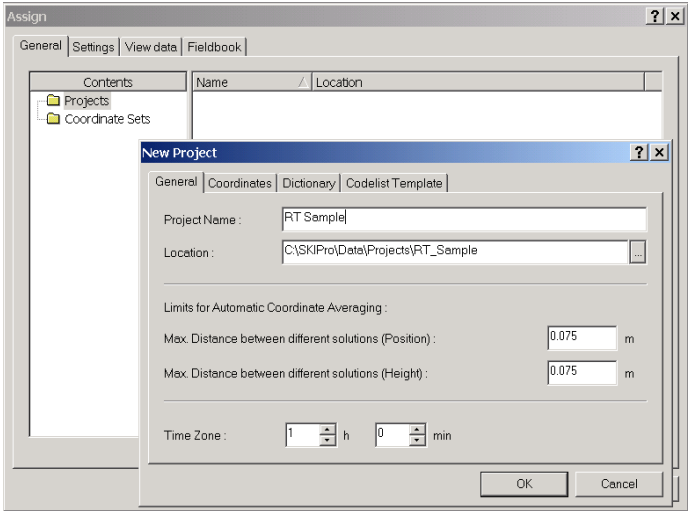


This is where you can view and modify the raw data.

If you have not yet created any Project, the list of Projects is empty and you can not select an existing Project.

➢Right-click on **Projects** and select **New**.

The following dialog appears and allows you to create a new project while you are still in the Import (Assign) procedure:



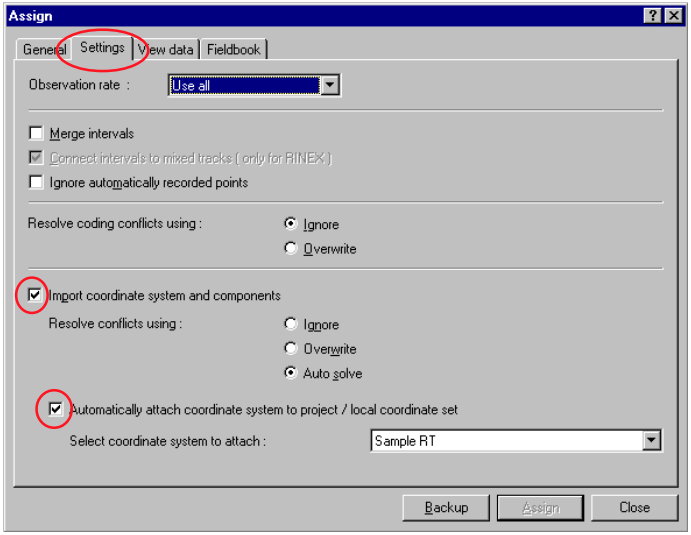
➢Under **Location** enter a path
e.g ***C:\SKIPro\Data\Projects***
Alternatively you may use the browser.

➢Enter a **Project Name** e.g. ***RT Sample***. Note that the directory *RT Sample* has been added automatically to the path. This is necessary because a Project consists of several files and each Project shall be stored under a separate directory.

➢Click **OK** to confirm. The New Project Dialog will be closed and a new Project will be created and selected automatically.

Alternatively you can also create a Project using the New Project command from the File menu or Toolbar or via the Project Management of the List Bar.

➢Back in the Assign dialogue click the **Settings** tab.

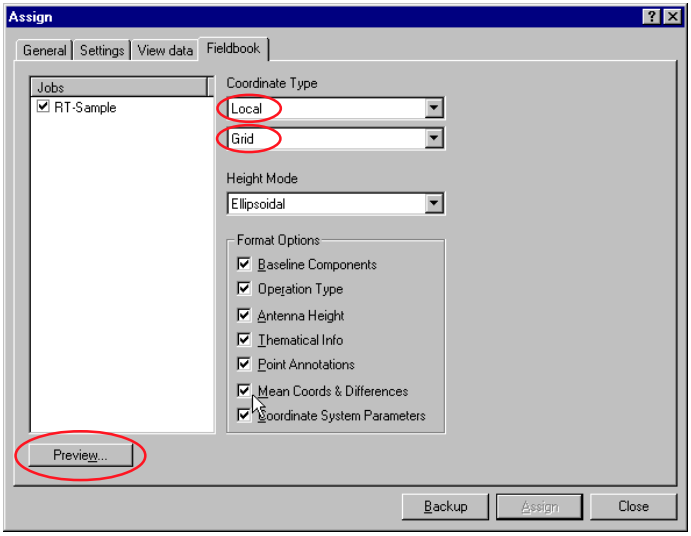


Here you can select the coordinate system, that has been used in the field to be imported into the SKI-Pro Coordinate System Management. Additionally the Coordinate System will be automatically attached to the project to which you assign the data.

➢Make sure both options are checked as indicated above.

Alternatively you can also attach any other coordinate system to the project later.

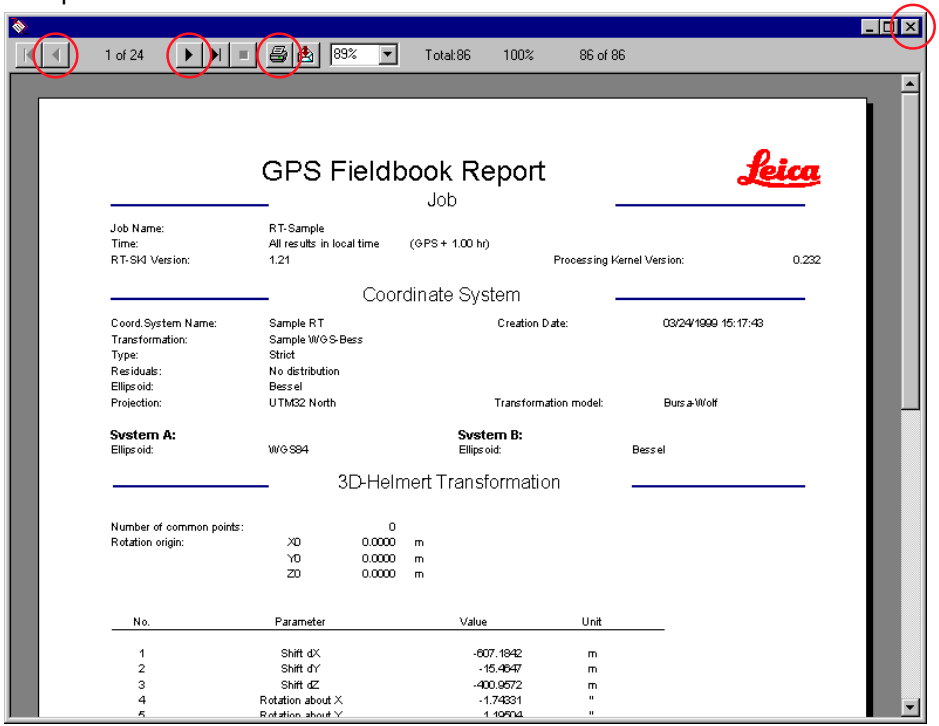
➢Click the **Fieldbook** tab to create a fieldbook report.



➢Select Coordinate Type **Local** and **Grid** as shown above.

➢Click **Preview…** to view the report.

A GPS Fieldbook Report will be generated and shown in a Report View:



The GPS Fieldbook Report displays the details of the survey completed in the field.

To scroll through the report use the toolbar buttons ◀ and ▶.
or press **Ctrl PgDown** and **Ctrl PgUp**.

To print the report click on 🖶.

➢To close the Report View click ✕ in the upper right corner.

➢Click the **General** tab to return to the General page of the Assign dialog

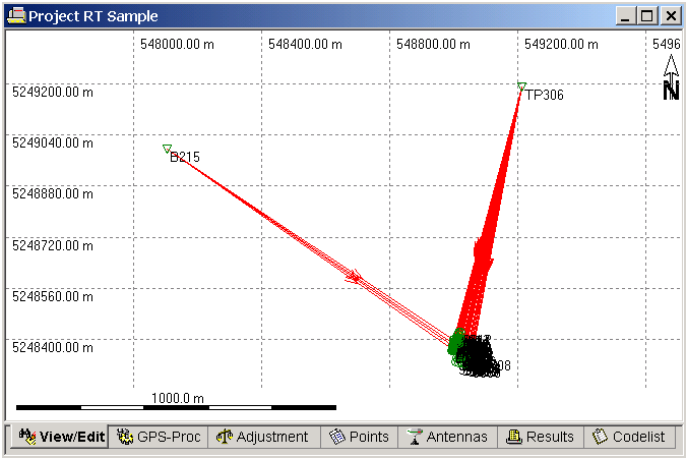
➢Select **Assign** and then **Close**.

The Project window will open automatically and display the surveyed points in the local grid coordinate system.

Continue with Lesson Two – Exploring the View/ Edit component.

In Lesson Two you will learn some useful features of the View Edit component.

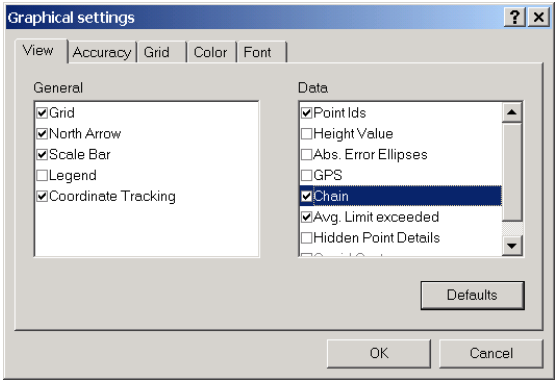
The View/Edit project window opens directly in local grid zooming to the full extents including the reference stations.



➢Use the toolbar button to zoom into the detail points.

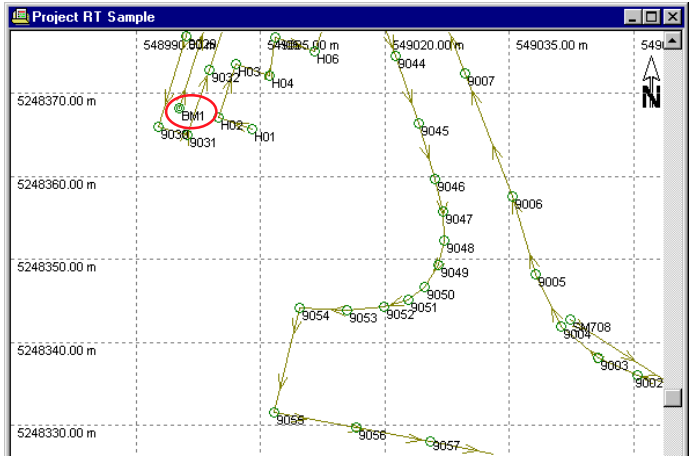
To get a clearer view you may additionally want to switch off the GPS baseline vectors (the red lines) and switch on the grid lines and the chains (yellow lines) showing how the survey was performed.

➢Right-click on the background select **Graphical Settings** and change the settings as shown below.



Refer to the Online Help for more information about the other graphical settings.

The display should now look as follows:



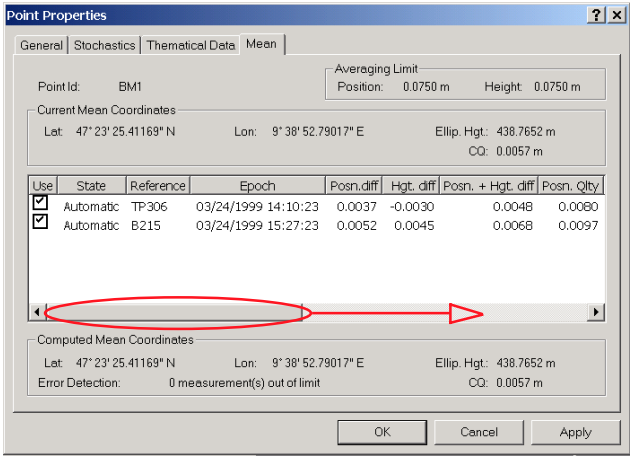
The Point symbols ⊙ indicate, that the point class is already *Measured*, as the points were measured in real time in the field. For some points (e.g. BM1) the point symbol ◎ indicates, that the point class is *Averaged*, because these points have been occupied twice. For these two solutions a weighted average is automatically computed.

➢Right-click on point **BM1** and select **Properties**. Alternatively you can also double-click on the point symbol.

If the point is not within the zooming extents, you can use the scroll-to point combobox BM1 and the Edit Point toolbar button.

➢Click the **Mean** tab in the property sheet.

The following Property page displays the two solutions and their differences to the weighted average:



➢Drag the horizontal scroll bar to the right to display more information.

➢Click **OK** or **Cancel** to exit the property sheet.

Lesson Three - Exporting Coordinates to a Custom ASCII File

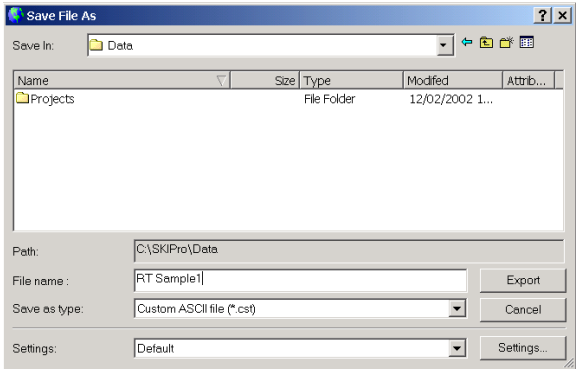
In this Lesson you will learn how to Export coordinates to a customized ASCII file. The *Custom ASCII File* export type is using a pre-defined format template file (*.frt) to export the data. Format template files can be created using the *Leica Format Manager* program. To complete this exercise a sample format template file (sample.frt) is installed automatically on your computer with SKI-Pro. However If you whish to create your own format template file please refer to **Quick Tour III - Format Manager**.

You can export coordinates in a variety of other pre-defined formats. Please refer to the On-line Help on Export ASCII and Export GIS/CAD for more information.

While the Project is still open:

➢From the **Export** menu select **ASCII**,
or
➢from the **Tools** List Bar or Toolbar select **Export ASCII Data** .

The following dialog appears:



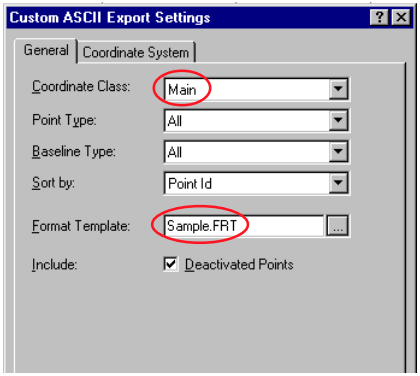
➢Under **Save in** select a path.

➢Under **Save as type** select **Custom ASCII File**.

➢Enter a **File name** e.g. ***RT Sample1*** without extension.

➢Click on the **Settings** button to change the settings and select the format template file.

The following Property page appears:



➢Change Coord. Class to **Main**. The coordinate triplets of the highest class will be exported.

➢ Use the browser … to select the file *…\Shared\Templates\Format Manager**Sample.frt**.*

Depending where you installed SKI-Pro the path for the sample file may vary slightly. By default SKI-Pro will be installed in: *C:\Program Files\Leica Geosystems\...*

➢To continue, click on the **Coordinate System** tab.

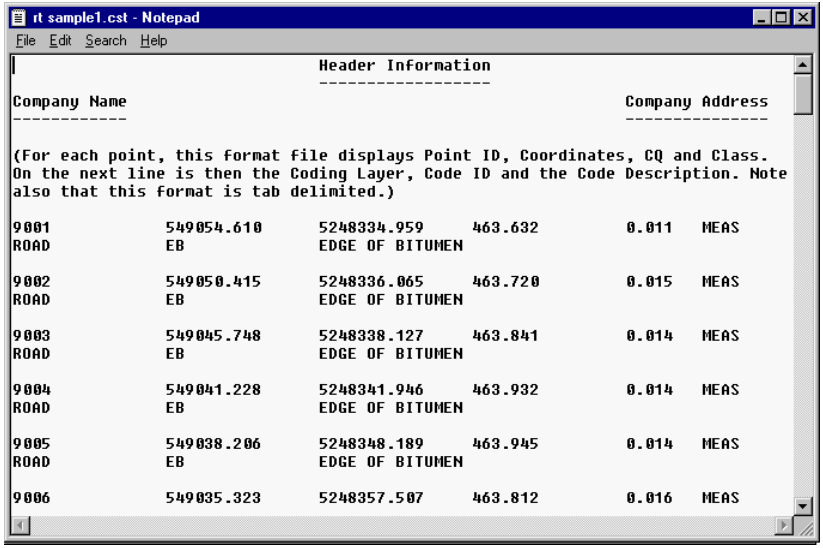
➢Make sure the **Coordinate System *Sample RT*** is selected. By default the coordinate system attached to the current project is already selected.

➢Click on **OK** to close the Settings property page,

and finally,

➢Click **Save** to write the file to the harddisk.

If you open the ASCII file with a Text Editor it will display the following information:


rt sample1.cst - Notepad
File Edit Search Help
Header Information
Company Name
Company Address
(For each point, this format file displays Point ID, Coordinates, CQ and Class.
On the next line is then the Coding Layer, Code ID and the Code Description. Note
also that this format is tab delimited.)
9001 549054.610 5248334.959 463.632 0.011 MEAS
ROAD EB EDGE OF BITUMEN
9002 549050.415 5248336.065 463.720 0.015 MEAS
ROAD EB EDGE OF BITUMEN
9003 549045.748 5248338.127 463.841 0.014 MEAS
ROAD EB EDGE OF BITUMEN
9004 549041.228 5248341.946 463.932 0.014 MEAS
ROAD EB EDGE OF BITUMEN
9005 549038.206 5248348.189 463.945 0.014 MEAS
ROAD EB EDGE OF BITUMEN
9006 549035.323 5248357.507 463.812 0.016 MEAS

Congratulations !

You have successfully completed this Quick Tour.

You have learnt how to create a Project, Import GPS real time data including the attached coordinate system, check the data in View/Edit and finally how to export these coordinates to a customized ASCII file.

Quick Tour II - Post-Processing

This Quick Tour is a step-by-step tutorial in which you learn to post-process GPS data from importing raw data to exporting final local Grid coordinates.

This exercise assumes that your green software protection dongle is connected and the two options **GPS-processing** and **Datum and Map** are activated.

The exercise comprises of the following scenario:

A rapid static network has been measured. It consists of the points TP214, B215, TP306, B218 and B313. The whole network has been measured with two receivers only. The raw data is given in the directories:

...\SkiPro\Data\SampleData\Sys500\Static\data1
...\SkiPro\Data\SampleData\Sys500\Static\data2.

The local coordinates of the points B215, B218, B313 are known in *UTM Zone 32 North* Projection and *Bessel* Ellipsoid. The coordinates are given in the file:

...\SkiPro\Data\SampleData\Static\Local.txt

The local grid coordinates of the points **TP214** and **TP306** shall be derived.

This Quick Tour comprises of the following steps:

Lesson One

- ☐ Importing GPS raw data
- ☐ Creating a Project

Lesson Two

- ☐ Modifying reference coordinates
- ☐ Processing baselines

Lesson Three

- ☐ Creating a Coordinate System

Lesson Four

- ☐ Importing an ASCII file with local coordinates

Lesson Five

- ☐ Calculating Transformation Parameters

Lesson Six

- ☐ Using a Coordinate System with a Project

Lesson Seven

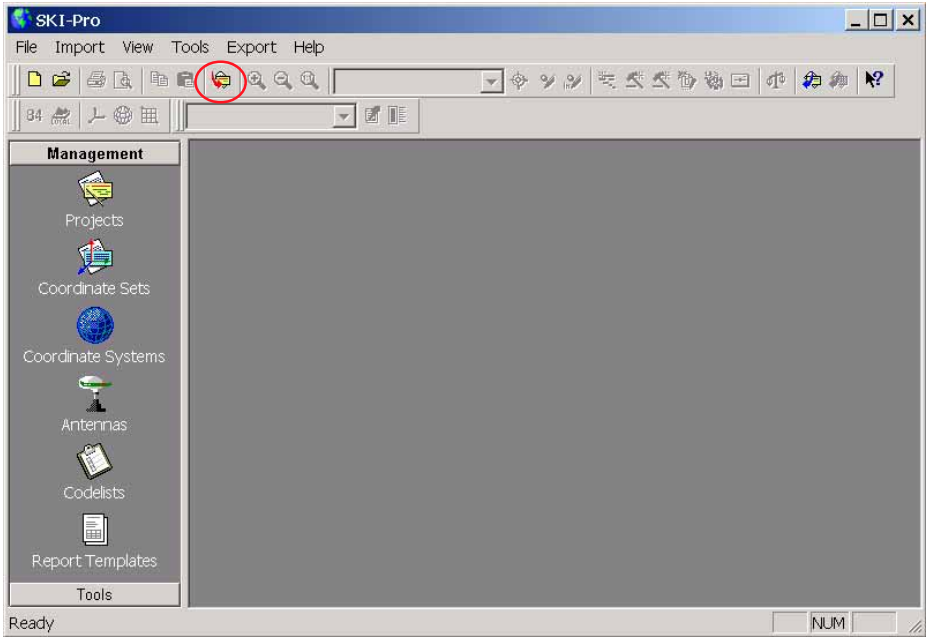
- ☐ Exporting Coordinates to an ASCII file

In Lesson One you will learn how to import GPS raw data and at the same time create a new Project.

Start-up SKI-Pro:

➢From the **Start** menu select **Programs**, **SKI-Pro** and then click on **SKI-Pro**.

The main SKI-Pro window appears.

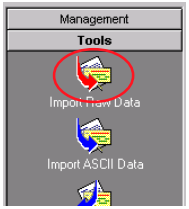


➢From the **Import** menu or Toolbar select

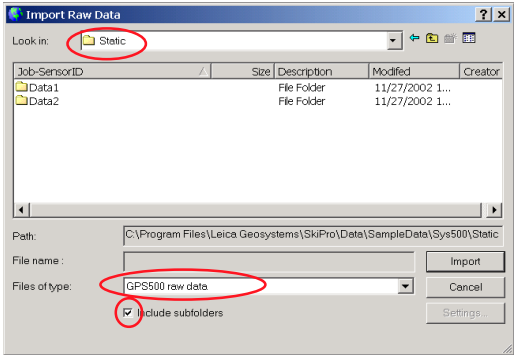
GPS Raw Data .

or

➢from the **Tools** List Bar select **Import GPS Raw Data**.



The following dialog appears:



➢Under **Files of type:** select **GPS500 raw data**.

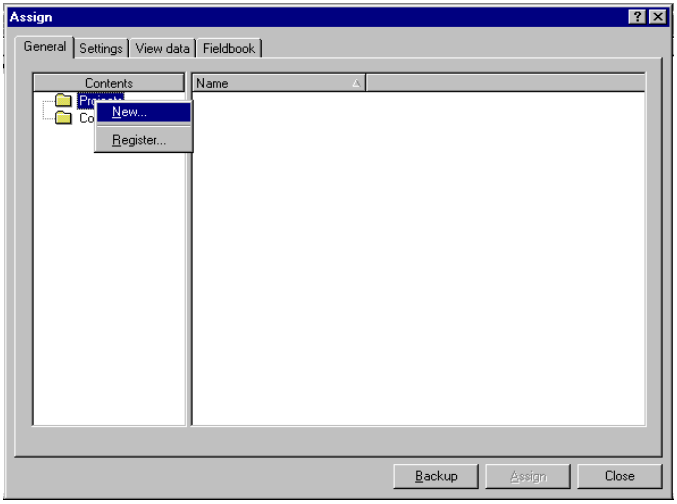
➢Under **Look in:** select the directory that contains the sample data: *...\SkiPro\Data\SampleData\Sys500**Static***

➢Check ☑ **Include subfolders**: all GPS500 raw data in the two sub-directories *data1* and *data2* will be imported in one run.

Depending where you installed SKI-Pro the path for the sample data may vary slightly. By default SKI-Pro will be installed in: *C:\Program Files\Leica Geosystems\...*

➢Click **Import**.

The following Property Sheet appears:

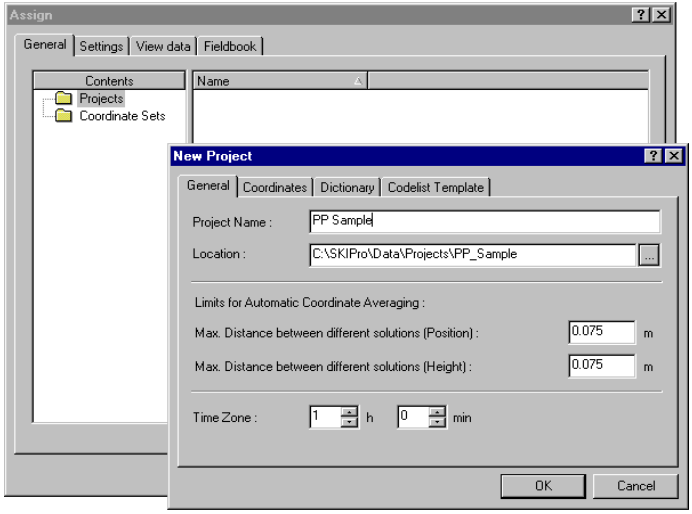


This is where you can view and modify the raw data. e.g. to change instrument heights or point id's.

As you have not yet created a Project the list of Projects is empty and you can not select an existing Project.

➢Right-click on **Projects** and select **New**.

The following dialog appears and allows you to create a new project while you are still in the Import (Assign) procedure:



➢Under **Location** enter a path
e.g ***C:\SKIPro\Data\Projects***
Alternatively you may use the browser ...

➢Enter a **Project Name** e.g. ***PP Sample***. Note that the directory *PP Sample* has been added automatically to the path. This is necessary because a Project consists of several files and each Project shall be stored under a separate directory.

➢Click **OK** to confirm. The New Project Dialog will be closed and a new Project will be created and selected automatically.

Alternatively you can also create a Project using the New Project command from the File menu or Toolbar or via the Project Management of the List Bar .

➢Back in the Assign dialog select **Assign** and then **Close**.

The Project window will open automatically.

Continue with Lesson Two - Processing Baselines.

In Lesson Two you will learn how to process and store baselines.

The Project window allows you to display the content of a Project by using different tabbed views. Click on the tabs below the window to switch between the different views.

View/Edit shows a graphical representation of each point of the Project.

The Point Symbols indicate that the point class is still *Navigated* ⊡. I.e. the accuracy of the points is low (±100m).

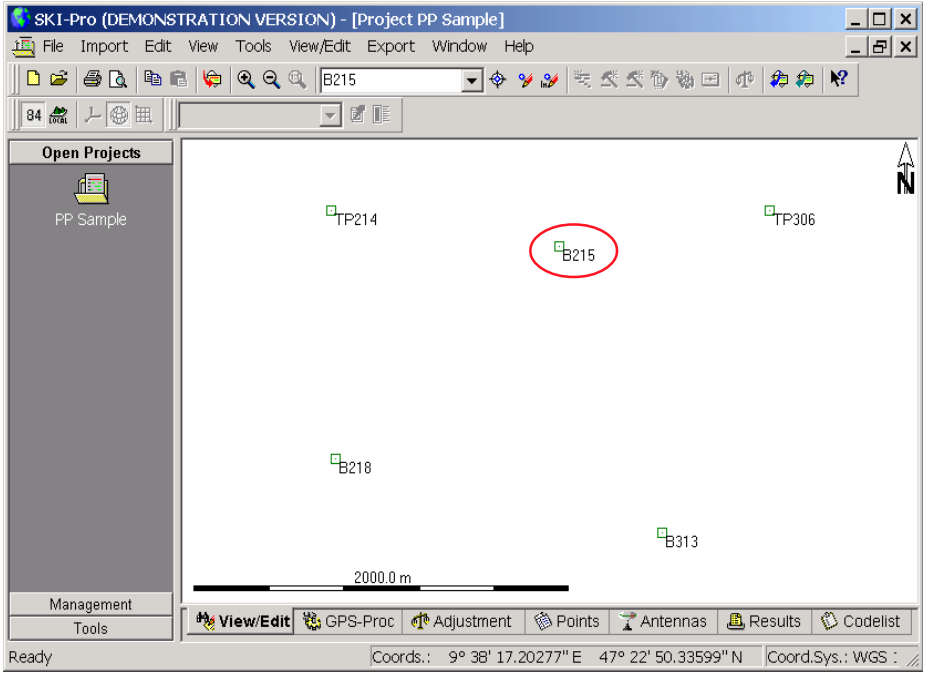
In order to avoid that the results of the baselines are influenced by systematic errors, the coordinates of the first reference point in the network have to be known within about 20m in the WGS84 coordinate system.

This can be achieved by starting the GPS survey on a point with known WGS84 coordinate or by using a Single Point Processing for the starting point of the network.

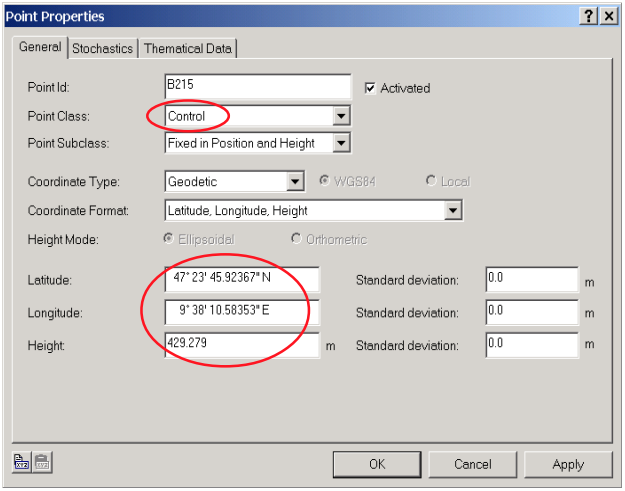
Please refer to the on-line help on how to perform a Single Point Processing.

In our case we will start the survey on a known point and therefore have to modify the coordinates of our first reference point.

➢Right-click on point **B215** and select **Properties**.



The Point Property Sheet appears:



➢Change the Point Class to **Control**.

➢Change the Coordinates to the values below:

Latitude:	47°	23’	45.92367	N
Longitude:	9°	38’	10.58353	E
Height:	429.279			m

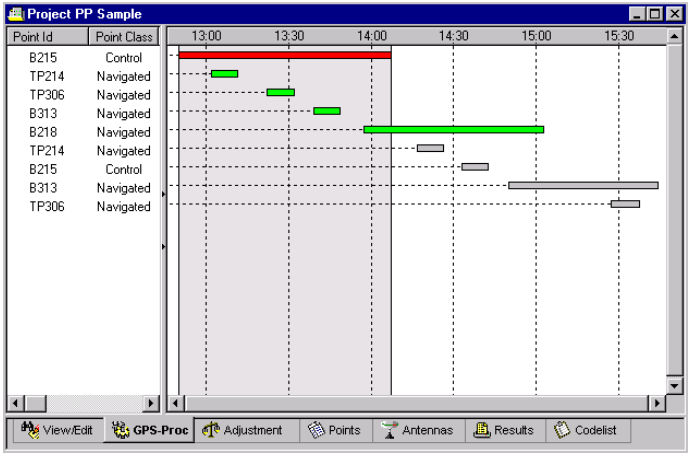
➢Click **OK** to confirm.

The Point Symbol of point B215 indicates that the point class is now *Control.*

You are now ready to switch to the GPS-Processing View and select the baselines to be processed.

➢Click the **GPS-proc** tab at the bottom of the window.

The following View displays a list of all observation intervals and a graphical representation of the observation time for each interval:



A Baseline is always processed between a Reference point and a Rover point. In the graphical window all observations are represented by horizontal bars which you can select as Reference or Rover.

In our network the point B215 was first used as a Reference and the points TP214, TP306, B313 and B218 have been observed as Rover points.

Afterwards point B218 was used as the Reference and the points TP214, B215 and B313 were observed as Rover.

Finally point B313 was the Reference and TP306 was the Rover.

Therefore to process all baselines we have to make three processing runs.

➢Right-click on the background of the graphical window, click on **Select Mode** and then **Rover**.
-or-
➢click on **Select Mode: Rover** from the Toolbar.

The cursor indicates Rover.

➢Click on the horizontal bars of the first instant of point **TP214**, **TP306**, **B313** and **B218**.

The colour of the Rover intervals changes to Green.

To select the Reference point:

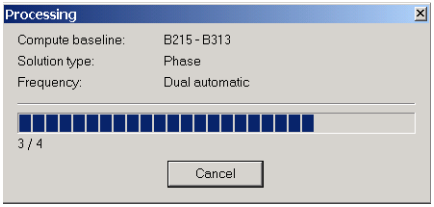
➢Right-click the on horizontal bar of point **B215** and select **Reference**.

The colour of the Reference interval changes to Red.

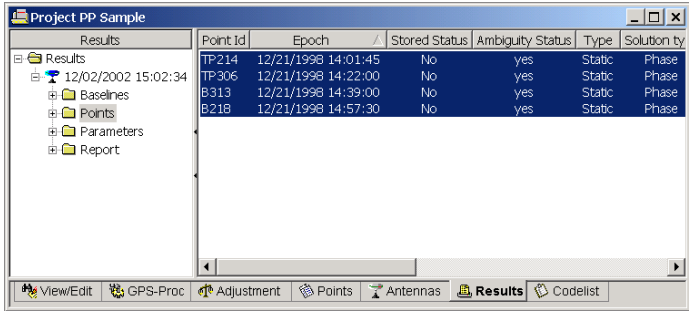
We are now ready to start the first processing run and process four baselines.

➢Right-click on the background and select **Process**
or
➢click on **Process** from the Toolbar.

A progress indicator will be displayed and the number below indicates which baseline out of the total number is currently being processed.



After the processing run is completed the display will automatically switch to the Results-View allowing you to examine and store the processed baselines:



All Rover points are listed together with its coordinates, quality and the Ambiguity Status. The points for which the Ambiguity Status is *yes* are selected automatically.

What does Ambiguity Status mean?

The Ambiguity Status is an essential indicator if you want to achieve centimetre level accuracy with short observation times (Rapid Static).

Ambiguity Status **yes** indicates that the determination of the integer number of cycles between the satellites and the GPS receiver was successful, i.e. the baseline calculation is correct.

Ambiguity Status **no** indicates that the ambiguities could not be resolved.

Ambiguity Status **?** indicates that no attempt has been made to resolve the ambiguites.

If the Ambiguity Status is **no** or **?** you may further analyse the data by viewing the GPS-processing Report. Please refer to the On-line Help for more information on the Report.

By default, ambiguities can only be resolved for baselines up to 80 km. For longer distances the ambiguity resolution becomes unreliable. To achieve good results on baselines longer than 80 km you will need to observe for longer periods of time.

In our case the Ambiguity Status is **Yes** for all points (baselines) and we can store the coordinates to the database.

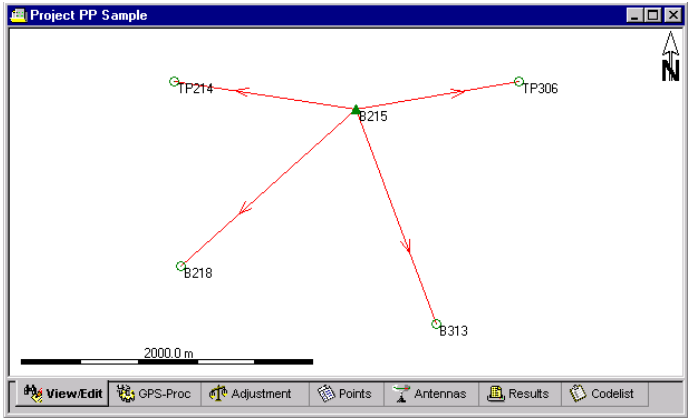
➢Right-click on the selected points and select **Store** or use the toolbar .

The results of the four baselines are now stored in the database.

➢To verify that the baselines have been stored, click the **View/Edit** tab at the bottom of the window.

➢Right-click in the background and select **Graphical Settings...** Make sure **GPS** is checked.

The following view is displayed:



To complete the network we have to process the remaining two processing runs.

➢To return to the GPS-Processing View click the **GPS-proc** tab.

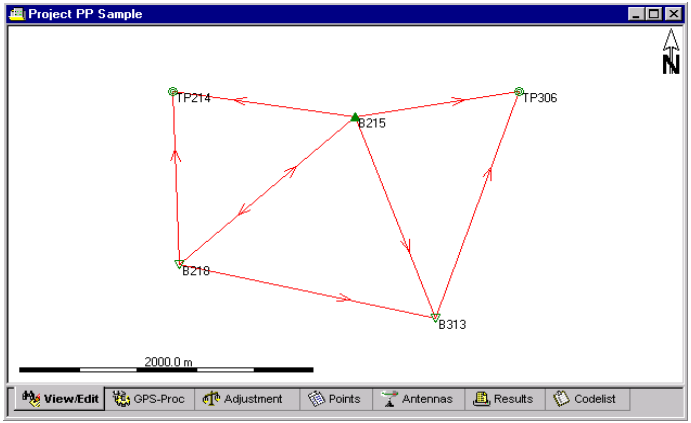
➢Right-click on the background and click on **Deselect All**.

➢Select the second instant of the points **TP214**, **B215**, **B313** as Rover and the point **B218** as Reference.

➢**Process** and **Store** the second run.

➢Finally, **Select**, **Process** and **Store** the remaining baseline between **B313** and **TP306**.

The following view is displayed:



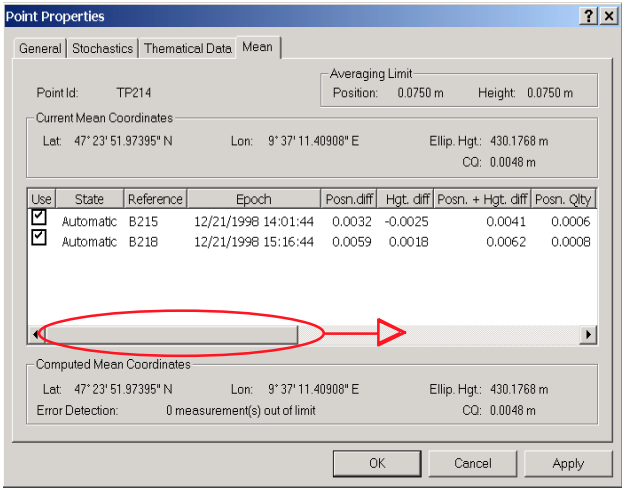
In View/Edit you will notice that the point symbols have now changed for all points. The point classes are no longer *Navigated*. Points that have been used as reference points are now awarded the point class *Reference* ▽. Others have point class *Measured* ⊙ or, if they have been measured from two different reference stations, class *Averaged* ◎.

In a project database there may exist many coordinate triplets for any one point. The coordinate classes represent the hierarchical order of a coordinate triplet. SKI-Pro always displays the coordinate triplet with the highest class for each point as default. For a complete list of all Coordinate Classes refer to the On-line Help.

The points TP214 and TP306 consist of two coordinate triplets of class *Measured* ⊙. From these two coordinate triplets a weighted average is calculated automatically and a new coordinate triplet of class *Averaged* ◎ is displayed.

➢Right-click on point **TP214** and select **Properties**. Click the **Mean** tab on the top of the Property Sheet.

The following Property Sheet displays the two solutions and their differences to the weighted average:



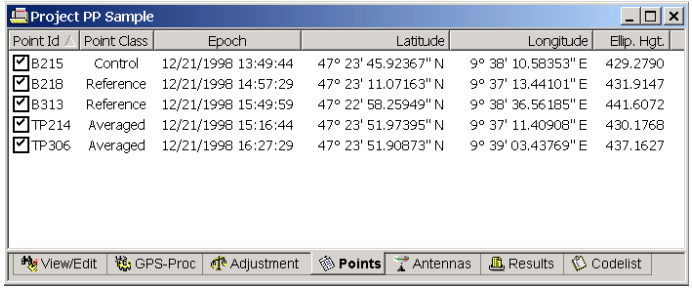
➢Drag the horizontal scroll bar to the right to display more information.

➢Click **OK** or **Cancel** to exit the Property Sheet.

To display all point information in a Report-View:

➢Click the **Points** tab at the bottom of the window.

The following view is displayed:



To change the width of a column:

➢Drag the right side of a column header as required.
or
➢Right-click on any column header and select **Auto arrange**. All columns will be arranged automatically.

To sort the list:

➢Click on a column header. The records will be sorted in ascending or descending order according to the selected column.

To display and hide information:

➢Right-click on a column header and select **Hide**.

➢Right-click on any column header, select **View** and select the required item from the list.

To print the content of the Report-View:

➢From the **File** menu or Toolbar select **Print** .

The print function can be accessed from any view, be it a Graphical-View or a Report-View.

You have now finished the data processing. Five points in the WGS84 coordinate system with centimetre accuracy are now available.

➢From the **Window** menu select **Close** or click the lower icon in the top right corner.

Continue with Lesson Three - Creating a Coordinate System.

In this Lesson you will learn how to create a Coordinate System.

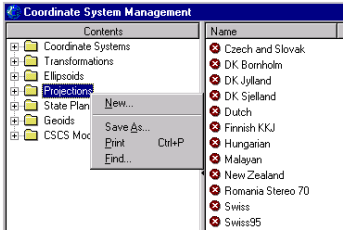
A Coordinate System defines the parameters used to calculate different coordinate representations. If a Coordinate System is attached to a Project or a Coordinate Set it enables you to switch between displaying the coordinates in Cartesian (X,Y,Z), Geodetic (Latitude, Longitude, Height) or Grid (Easting, Northing, Height) format. Additionally if a Transformation is defined you can switch the coordinates of a Project between the WGS84 and a local datum.

What we already know of our Coordinate System is that the local Ellipsoid is *Bessel* and the Map Projection is *UTM32 North*. The Transformation is not yet known and has to be determined by using the Datum/Map tool first.

To open the Coordinate System Management:

➢From the **Tools** menu or **Management** List Bar, select **Coordinate System Management**.

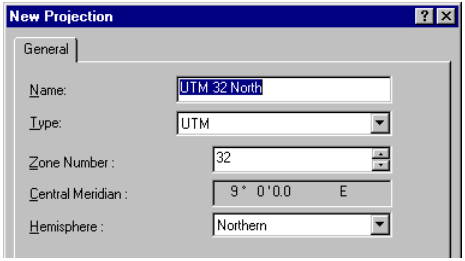
The following Explorer-View appears:



First you have to define the Map Projection:

➢In the Tree-View right-click on **Projection** and select **New.**

The following Property page appears:

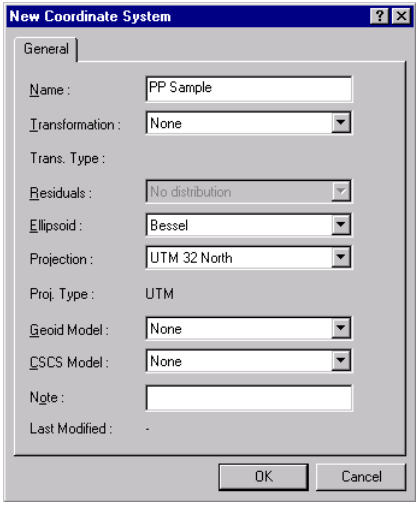


➢Fill in the Property page as above.

➢Click **OK** to confirm.

➢In the Tree-View right-click on **Coordinate Systems** and select **New.**

The following Property page appears:



➢Fill in the Property page as above.

➢Click **OK** to confirm.

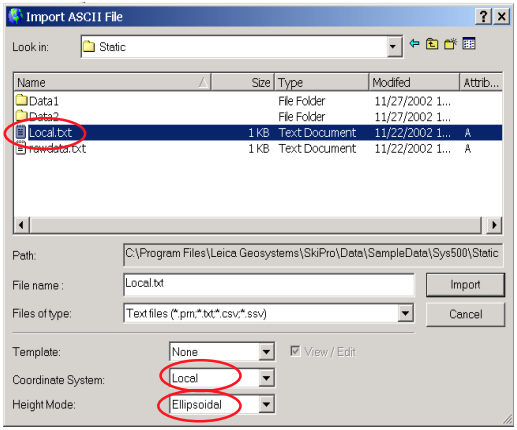
➢From the **Window** menu select **Close** or click the lower ✕ icon in the top right corner to close the Coordinate System Management.

Lesson Four - Importing an ASCII File

In this Lesson you will learn how to import the local control points from a user defined ASCII file and create a Coordinate Set.

➢From the **Import** menu click **ASCII data**.
or
➢from the **Tools** List Bar click **Import ASCII Data**

The following dialog appears:



➢Choose the file type **Text files**.

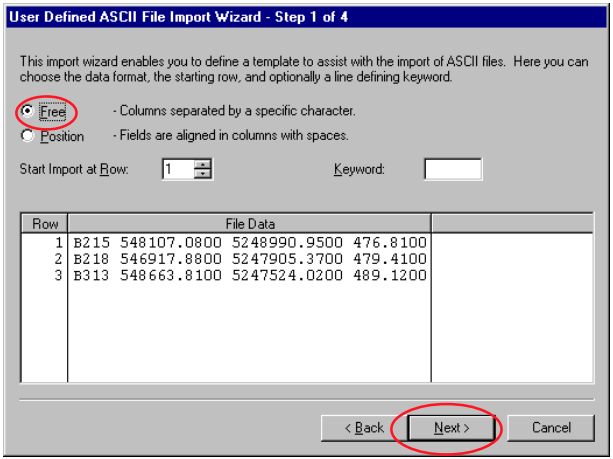
➢Under **Look in** select the directory that also contains the sample data:
*...\SkiPro\Data\SampleData\Sys500**Static***

➢Select the file **Local.txt**

➢Under Coordinate System select **Local**.

➢Click **Import**.

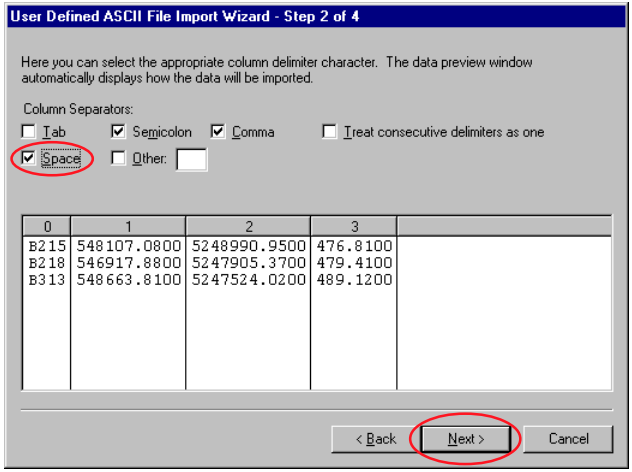
This is the first time you are importing an ASCII file of this type. The import Wizard for user defined ASCII files appears automatically, allowing you to define the file format:


User Defined ASCII File Import Wizard - Step 1 of 4
This import wizard enables you to define a template to assist with the import of ASCII files. Here you can choose the data format, the starting row, and optionally a line defining keyword.
Free
- Columns separated by a specific character.
Position
- Fields are aligned in columns with spaces.
Start Import at Row:
1
Keyword:
Row
File Data
1 B215 548107.0800 5248990.9500 476.8100
2 B218 546917.8800 5247905.3700 479.4100
3 B313 548663.8100 5247524.0200 489.1200
< Back
Next >
Cancel

The file to be imported is a simple ASCII file. The local coordinates of the points B215, B218 and B313 are separated with spaces and neither a column header nor a keyword is defined.

➢Click **Free** and then **Next** to continue.

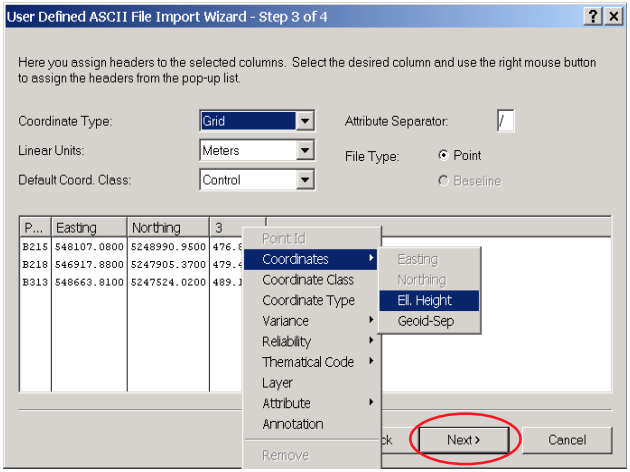
The Wizard Step 2 appears:


User Defined ASCII File Import Wizard - Step 2 of 4
Here you can select the appropriate column delimiter character. The data preview window automatically displays how the data will be imported.
Column Separators:
Tab
Semicolon
Comma
Treat consecutive delimiters as one
Space
Other:
0 1 2 3
B215 548107.0800 5248990.9500 476.8100
B218 546917.8800 5247905.3700 479.4100
B313 548663.8100 5247524.0200 489.1200
< Back
Next >
Cancel

➢Check **Space**, the columns will be selected automatically.

➢Click **Next** to continue.

The Wizard Step 3 appears:



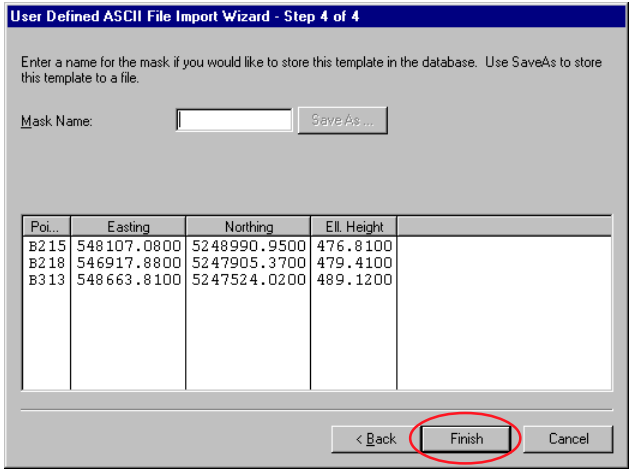
➢Right-click on the first column heading (0) and select **Point Id**

➢Right-click on the second column heading (1) and select **Coordinates** and then **Easting**.

➢Select **Northing** and **Ell. Height** for the third (2) and fourth (3) column respectively.

➢Click on **Next** to continue.

The Wizard Step 4 appears:


User Defined ASCII File Import Wizard - Step 4 of 4
Enter a name for the mask if you would like to store this template in the database. Use SaveAs to store this template to a file.
Mask Name:
Save As ...
Poi... Easting Northing Ell. Height
B215 548107.0800 5248990.9500 476.8100
B218 546917.8800 5247905.3700 479.4100
B313 548663.8100 5247524.0200 489.1200
< Back
Finish
Cancel

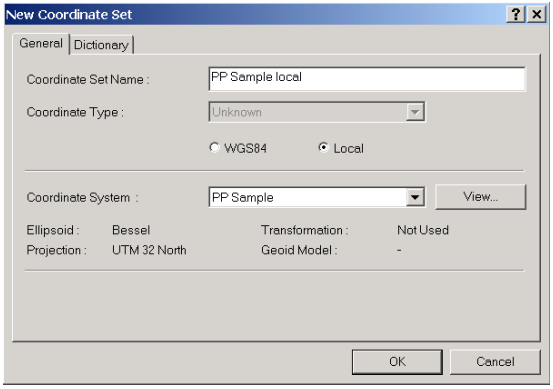
➢Click on **Finish** to close the Wizard.

If you want to import coordinate files of the same type again you can enter a Mask Name and then use this Mask as a Template the next time you import an ASCII file.

You can now assign the points to either a Project or a Coordinate Set. Since these are our control points for the determination of the transformation parameters we will assign them to a Coordinate Set.

➢Right-click on **Coordinate Sets** and select **New**.

The following Property-Sheet appears:

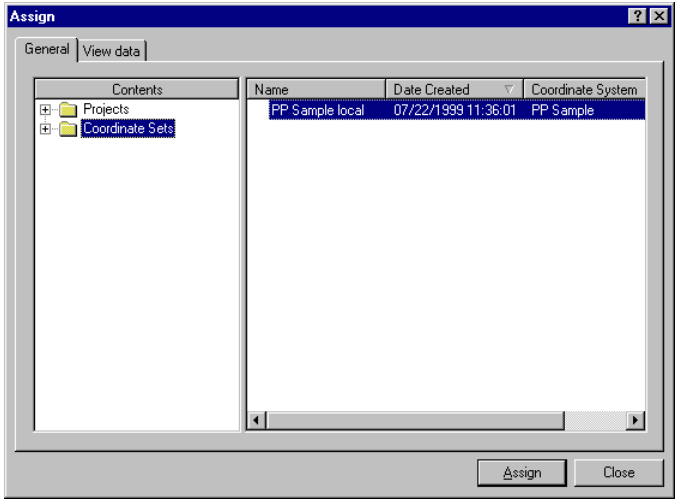


➢Enter the **Coordinate Set Name** e.g. *PP Sample local.*

➢Select the Coordinate System **PP Sample** from the list.

➢Click on **OK** to confirm.

The Coordinate Set is created and selected automatically:



➢Click on **Assign** and then **Close**.

The Coordinate Set will open automatically and display the local coordinates for the points B215, B218 and B313.

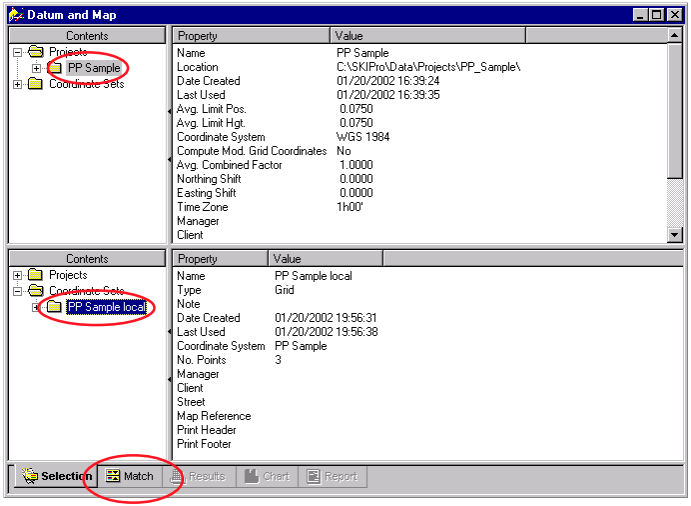
➢From the **Window** menu select **Close** or click the lower ✕ icon in the top right corner.

In this Lesson you will learn how to use the Datum/Map tool to calculate the transformation parameters.

In order to be able to calculate Transformation parameters we need two sets of coordinates. The first set will be the coordinates of our Project *PP Sample* in the WGS84 coordinate system. The second set will be the imported local coordinates from the Coordinate Set *PP Sample local*.

➢From the **Tools** menu click **Datum/Map**.
or
➢from the **Tools** List Bar or Toolbar click **Datum and Map**.

The following view appears:

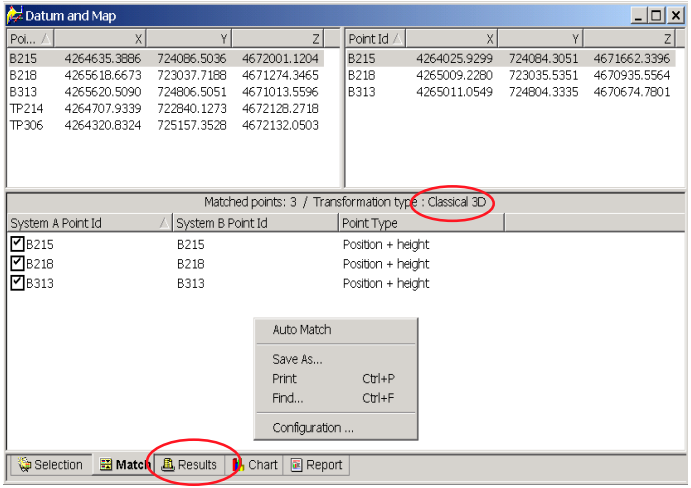


➢In the upper Tree-View open the **Projects** folder and select **PP Sample**.

➢In the lower Tree-View open the **Coordinate Sets** folder and select **PP Sample local.**

➢Click on the **Match** tab to continue.

The following view appears:



To configure the Transformation type:

➢Right-click on the background in one of the views and select Configuration or use the Toolbar button .

➢Under **Transformation** select **Classical 3D** and confirm with **OK**.

The *Classical 3D* is the transformation type that should normally be used when the local Ellipsoid and the Map Projection is known. However SKI-Pro supports a variety of different transformation types. Please refer to the On-line Help for more information.

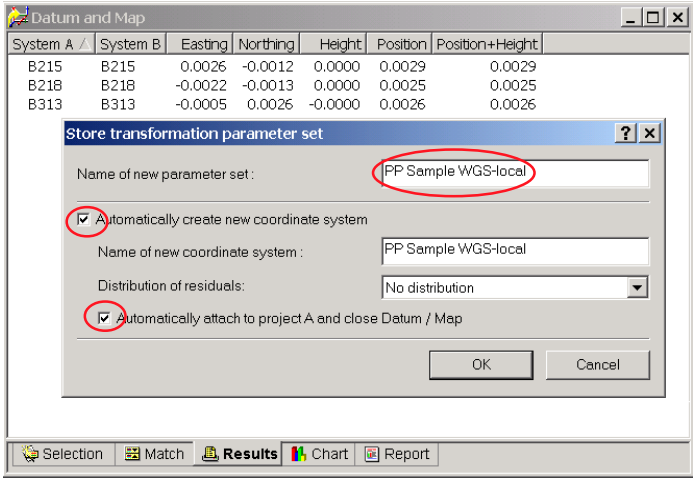
You can select the common points of system A and system B by selecting them manually or by using the Auto Match command:

➢Right-click on the background in one of the views and select **Auto Match**.

➢Click the **Results** tab to continue.

The transformation parameters are instantly calculated.

The following view appears and displays the residuals:



This view allows you to judge the quality of the transformation. Additionally you may display a **Chart** of the residuals or a **Report** by clicking on the appropriate tabs at the bottom of the window.

➢Right-click on the background and select **Store**.

The following dialog allows you to store the transformation parameters, create a new coordinate system based on the coordinate system of *System B* and attach it to the project (*System A*).

➢Enter a name e.g. ***PP Sample WGS-local***, check ☑ the two boxes and click on **OK** to confirm.

By default the names of the new transformation parameter set and the new coordinate system are the same. You may change the name of the coordinate system if you wish.

The transformation parameters and the new coordinate system are now stored and the new coordinate system is already attached to the project.

Continue with Lesson Six - Using a Coordinate System.

In this Lesson you will learn how to use a Coordinate System with a Project and switch between WGS84 and local coordinates.

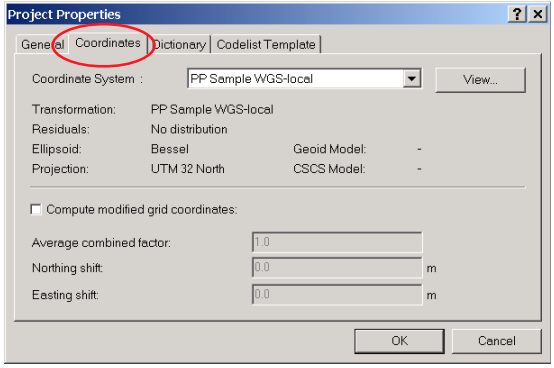
If the Project Management is not already open:

➢From the **Management** List Bar, select **Project Management**.

➢Right-click on the Project **PP Sample** and select **Properties**.

➢Click on the **Coordinates** tab.

The following dialog appears:



Here you can check that the new Coordinate System is attached to the Project and verify the parameters. Ellipsoid: *Bessel*, Map Projection: *UTM 32 North* and Transformation: *PP Sample WGS-local* should now be displayed.

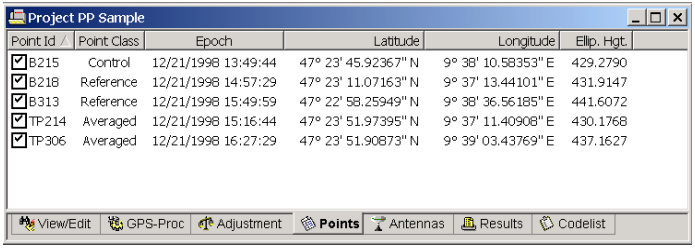
➢Click **OK** to continue.

➢Right-click on the Project **PP Sample** and select **Open**.

The Project window opens with the last used View active.

➢Select the Points tab.

The view displays WGS 1984 coordinates in Geodetic format:



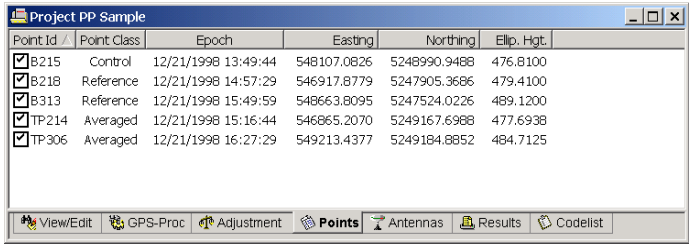
Since you are now using a Coordinate System with Ellipsoid, Map Projection and Transformation defined, you are able to switch the Coordinate System to Local and change the Coordinate type to Grid.

Using the Coordinate Format Toolbar it is possible to switch between the following different possibilities:

- WGS 1984 Cartesian
- WGS 1984 Geodetic
- Local Cartesian
- Local Geodetic (Bessel Ellipsoid)
- Local Grid (UTM 32 North Projection)

➢From the Toolbar click on **Local** and then **Grid**.

The view displays Local coordinates in Grid format:



The local grid coordinates of the unknown points **TP214** and **TP306** are now available.

You may now print the list
or
continue with Lesson Seven - Exporting local coordinates to an ASCII file.

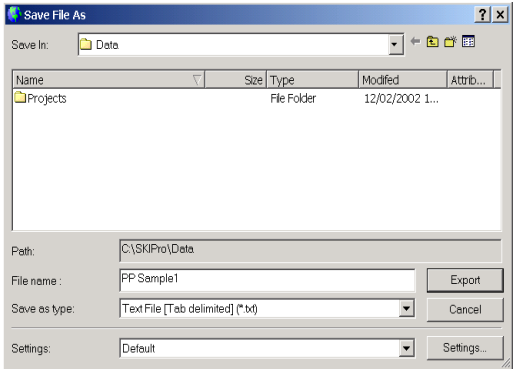
In this Lesson you will learn how to Export coordinates to a user defined ASCII file.

You can export coordinates to a variety of other pre-defined formats. Please refer to the On-line Help Export ASCII and Export GIS/ CAD for more information.

While the Project is still open:

➢From the **Export** menu select **ASCII**,
or
➢from the **Tools** List Bar or Toolbar select **Export ASCII Data**.

The following dialog appears:



➢Under **Save in** select a path.

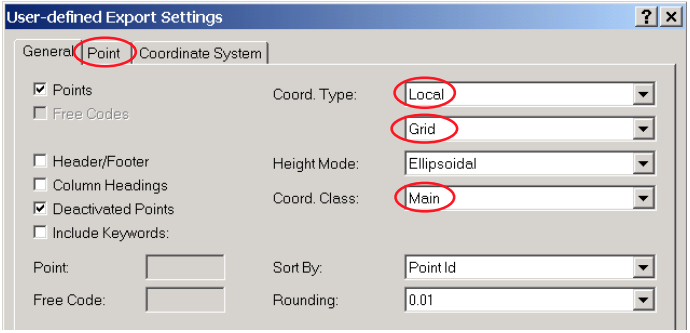
➢Under **Save as type** select **Text File**.

➢Enter a **File name** e.g. ***PP Sample1*** without extension.

Since you are using this export type for the first time you have to modify the Settings:

➢Click on the **Settings** button to change the export settings.

The following Property page appears:

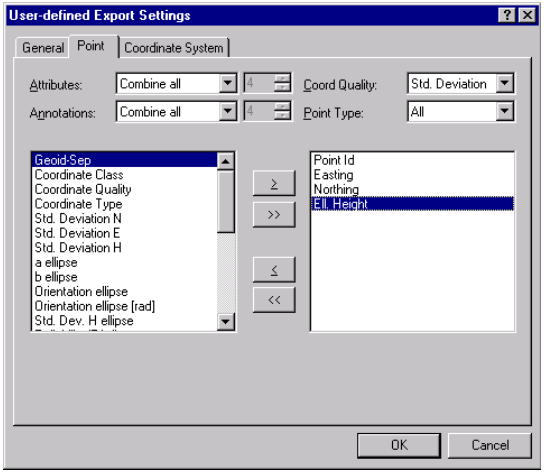


➢Change Coord Type to **Local** and **Grid**.

➢Change Coord. Class to **Main**. The coordinate triplets of the highest class will be exported.

➢To continue, click on the **Point** tab.

The following Property page appears:



Here you can define the actual point list of the ASCII file. You can select the items to export in the order you want.

➢Double-click on **Point Id** then **Easting**, then **Northing** then **Ell. Height**.

➢To continue, click on the **Coordinate System** tab.

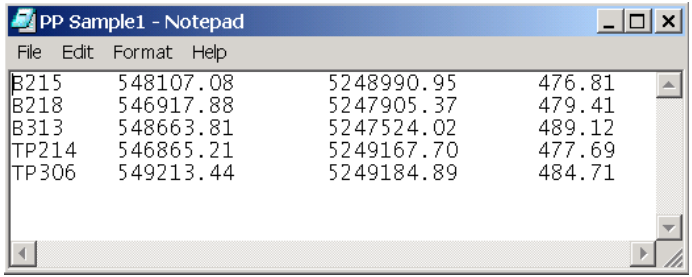
➢Make sure the **Coordinate System** ***PP Sample WGS-local*** is selected.

➢Click on **OK** to close the Settings property page,

and finally,

➢Click **Save** to write the file to the harddisk.

If you open the ASCII file with a Text Editor it will display the following information:



Congratulations !

You have successfully completed this Quick Tour.

You have learnt how to start a Project, Import GPS raw data, process baselines, determine a transformation, how to derive local Grid coordinates and finally how to export these coordinates to a user-defined ASCII file.

Lesson One - Creating a Format Template File

This Quick Tour is a step-by-step tutorial in which you learn how to work with the Leica Format Manager program. For further details see the 'Getting Started with Format Manager' manual.

The Format Manager is installed as an external program during the SKI-Pro installation. It allows the creation of a Format Template file (*.frt) wich can be used within SKI-Pro to export data to a customized ASCII file. *Custom ASCII File* export is the most flexible ASCII export type.

For more information refer to **Quick Tour I - Real Time** or the online help of SKI-Pro.

Additionally a Format Template file can be uploaded to the Sensor to convert Jobs to an ASCII file directly on the field system.

This exercise does NOT need your green software protection dongle to be connected.

This Quick Tour comprises of the following steps:

Lesson One

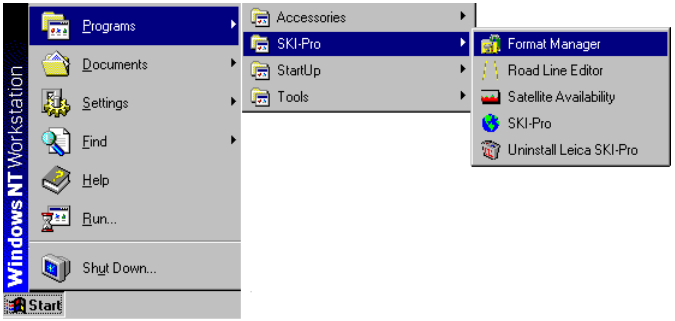
- ☐ Creating a Format Template File

Lesson Two

- ☐ Uploading a Format Template File to the Sensor

Start-up the Format Manager:

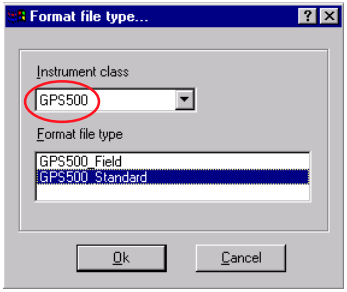
➢From the **Start** menu select **Programs**, **SKI-Pro** and then click on **Format Manager**.



The main Format Manager window appears.

➢From the **File** menu select **New**
or
➢Click on to create a new mask.

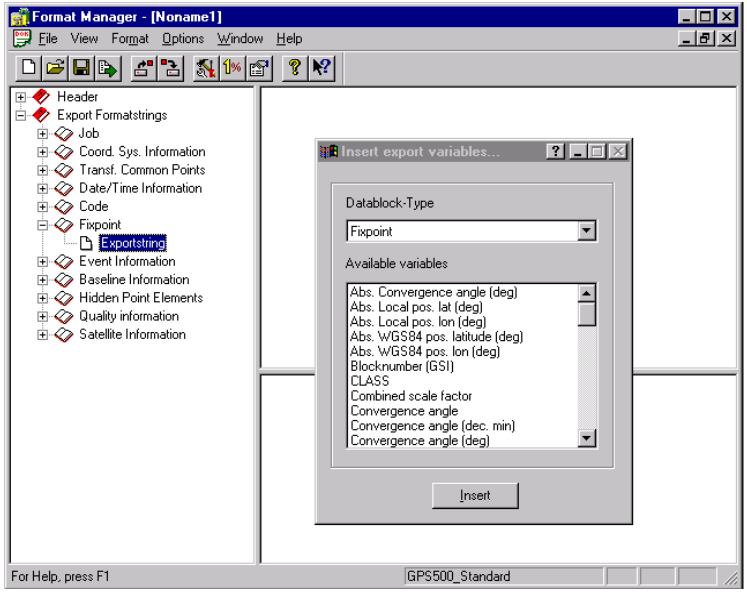
The following dialog appears:



➢Select Instrument class **GPS500**.

➢Click **OK** to confirm.

The workspace displays a tree-view on the left hand side:



To start creating the mask the tree-view has to be expanded.

➢Double-click on **Export Formatstrings**, then double-click on **Fixpoint (TPS/GPS)** and finally click on **Exportstring**.

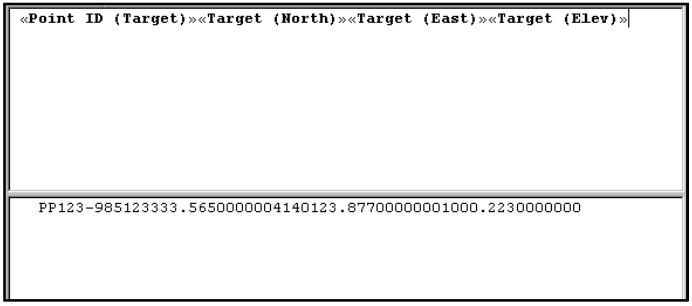
A dialogue appears with the available variables, which can be exported.

➢For this example double-click on the following variables:

Point ID (Target)
Target (North)
Target (East)
Target (Elev)

Target (Elev) stands for Orthometric Height, in order to export Ellispoidal Height you have to select *Local Ellipsoid Height*.

The list is filled automatically and displayed as follows:



➢To add thematical information change the combo box *Datablock-Type* to **Code(TPS/GPS)**.

➢Double-click on the following variables:

Code ID
Code description

➢To add quality information change the combo box *Datablock-Type* to **Quality Information (GPS)**.

➢Double-click on the following variable:
3D Coordinate Quality.

The thematical and the quality information shall be written to the second line of each data block.

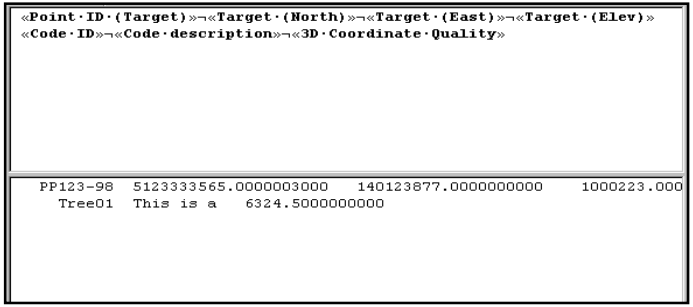
➢Move the cursor between the >> << symbols of <<*Target (Elev)*>> and <<*Code ID*>> and press **ENTER** to get a carriage return (new line) after *Target (Elev).*

➢Go to the end of the second line and press **ENTER** to ensure that each data block starts at a new line!

➢To set the delimiter between the variables click between the >> << symbols of each variable and press the **TAB** key.

As delimeter you can use any character from the keyboard. Even a combination of several characters is possible.

The display should now look as follows:



Note, that the lower window changes and shows an example of how your string will look like using dummy values.

At the moment the variables with real numbers contain 10 digits after the decimal point. This formatting can be changed for every variable.

➢In the upper window **double-click** on each variable name and change the formatting properties. For this example set the *Precision* to **3** for *Easting, Northing* and *Elevation*, and to **2** for the *3D Coordinate Quality*.

For more information on the variable formatting refer to the Format Manager online help and the Getting started with Format Manager manual.

➢Finally from the **File** menu select **Save** and enter a name for the format file. The extension (*.FRT) will be added automatically.

Congratulations !

You have learnt how to create a simple customized format mask. Now you can use this format file as an export template either directly on board the sensor or from within SKI-Pro using the *Custom ASCII Export*.

For the *Custom ASCII Export* of SKI-Pro please refer to the **Quick Tour I - Real Time** of this book.

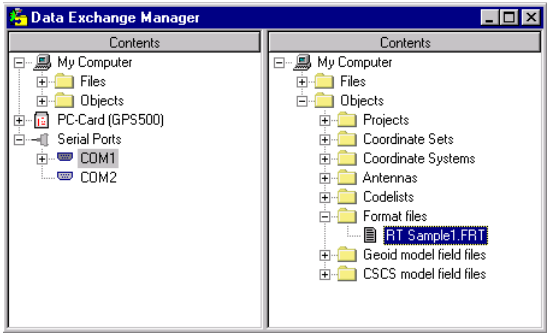
If you want to use the format mask file on the System 500 sensors, proceed with Lesson Two - Uploading a Format Template File to the Sensor.

On the PC:

➢**Copy** the file onto your Sensor into the **CONVERT** subdirectory of the PCMCIA card

or

➢If you have no PCMCIA slot on your PC, transfer the file to the sensor using the **Data Exchange Manager** component. In the right-hand pane select the format file from either the *Files* node or from the *Format files* subnode of the *Objects* node. In the left-hand pane open the *COM* node to which your instrument is connected and transfer the file via drag&drop.



For further details refer to the SKI-Pro Online Help.

On the Sensor:

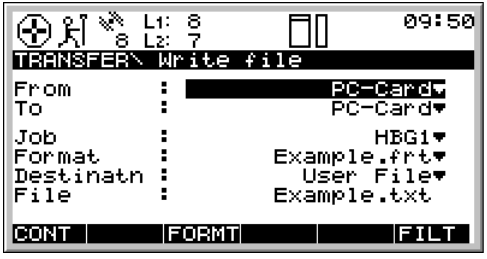
➢Select **Transfer**, then **GSI/ User File**. Select the *Job* you want to convert, the *Format* file and give a *File* name.

➢Note that Format Files need to be stored in the System RAM of the Sensor. Press **FORMT (F3)** to transfer such files from the \CONVERT directory of the PC Card or internal memory to the System RAM or vice versa.

➢Under *Destinatn* select **User File**, then the converted file will be written into the DATA directory on the PCMCIA card.

➢**FILT (F6)** allows to select a filter and set the sort order.

➢**CONT (F1)** to write the file.



For further details please refer to the *Technical Reference* manual, available as an online PDF-file.

Quick Tour IV - GIS/CAD Export

This Quick Tour is a step-by-step tutorial in which you learn how to export data from SKI-Pro to a GIS or CAD System using the DXF format.

The GIS/CAD Export requires a DXF-header file. A DXF-header file can be created in your CAD package and contains all block and attribute definitions, layer definitions, line styles, drawing extents and other settings needed by your GIS/CAD program in order to convert the DXF file into a drawing file. The DXF header file should be based on your GIS/CAD template file such that it contains all definitions that you work with. For information on how to create a DXF-header file please refer to the documentation of your GIS/CAD software package.

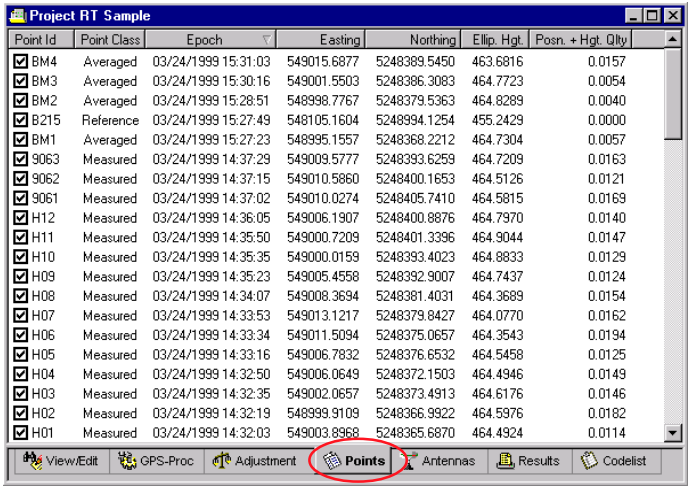
To complete this exercise a DXF-header sample file is already copied to your harddisk with the installation of SKI-Pro.

This exercise assumes that your green software protection dongle is connected and the option **GIS/CAD Export** is activated.

Before you start with this Quick Tour make sure that you have already imported the real time sample data into SKI-Pro as explained in **Quick Tour I - Real Time**.

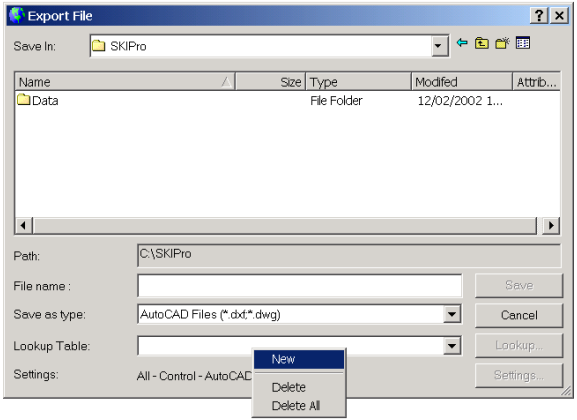
➢Open the Project **RT Sample**, then click on the **Points** tab to display local grid coordinates.

The following list should be displayed:



➢From the **Export** menu select **GIS/CAD...**
or
➢Click on from the Toolbar.

If you start the GIS/CAD Export with no Project open the program will prompt you to select a Project from the list before showing the following dialog:



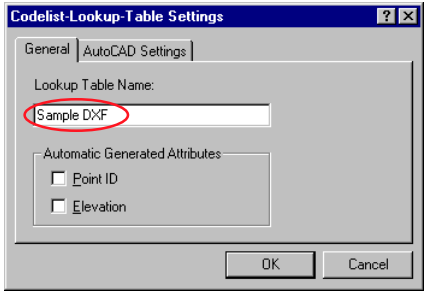
➢Under **Save as type** select **AutoCAD Files (*.dxf; *.dwg)**.

We now have to create a new Lookup Table. A LookupTable enables you to match thematical codes used in the field with blocks in the DXF-header file. Thus every thematical code can be matched with the required symbol in your CAD/GIS package.

➢In the **Lookup Table** box **right-click** and select **New** to create a new lookup table.

Once a lookup table is created it is available for future use.

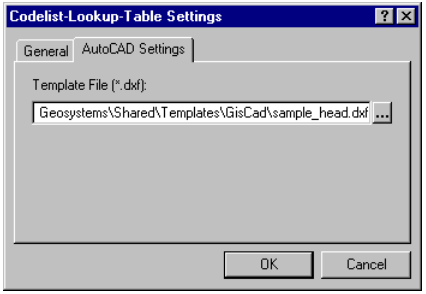
The following property sheet appears:



➢Enter a **Lookup Table Name**.

➢To continue click the **AutoCAD Settings** tab.

The following property sheet appears:



Here we select the DXF- header file for use for the GIS/ CAD Export.

➢ Use the browser ... to select the file *…\Shared\Templates\GisCad**Sample_head.dxf***

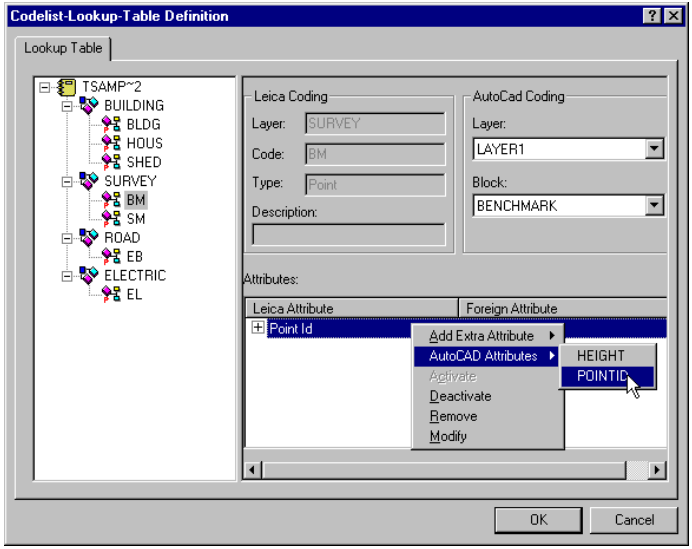
Depending where you installed SKI-Pro the path for the sample file may vary slightly. By default SKI-Pro will be installed in: *C:\Program Files\Leica Geosystems\...*

➢ Click **OK** to confirm the Lookup Table Settings.

The **Export File** dialog appears again and the **Lookup** button is now active.

➢ To continue click the **Lookup** button.

The following property sheet appears:



On the left hand side is a tree view of the codelist used in the field. On the right hand side you can open boxes for the AutoCAD Layers and Blocks as defined in the DXF-header file. You have to match the thematical codes used in the field with the AutoCad Coding (Layers and Blocks).

Additionally it is possible to match the attributes of each “Leica” Code with the attributes as defined for the AutoCAD blocks.

To match the first “Leica” Code with the AutoCAD Coding proceed as follows:

➢ In the Tree-View on the left expand all Layers by clicking on the ⊞ icons.

➢ In the Tree-View click on **BM** and select **LAYER1** and **BENCHMARK** from the combo boxes.

➢ In the Attributes window right-click, select **Add Extra Attribute** and then **Point Id**.

➢ Right-click again, select **AutoCAD** Attribute and then **POINTID**.

➢ In the same manner match the *Extra Attribute* **Elevation** with the *AutoCAD Attribute* **HEIGHT**.

The Code *BM* is now matched!

In the Sample Project the codes do not contain Attributes. Therefore it is only possible to match the default Attributes *Point Id* and *Elevation*.

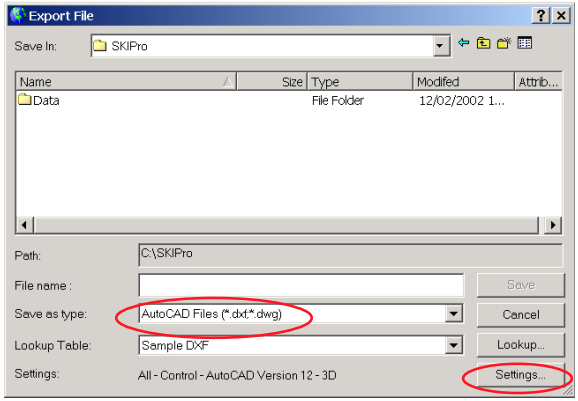
➢ Continue to match the remaining “Leica” Codes according to the list below:

ìLeicaî Code	ìLeicaî Attributes	Block Symbol and Attributes	AutoCAD Layer	AutoCAD Block	AutoCAD Attributes
BLDG (and) HOUS	Point Id Elevation		Layer 2	CROSS_PT	POINTID HEIGHT
SHED	Point Id Elevation		Layer 4	MEAS-POINT	POINTID HEIGHT
BM	Point Id Elevation		Layer 1	BENCHMARK	POINTID HEIGHT
SM	Point Id Elevation		Layer 6	MANHOLE	POINTID HEIGHT
EB	Elevation		Layer 3	EDGE_BITUMEN	HEIGHT
EL	Point Id Elevation		Layer 5	LIGHTPOLE	POINTID HEIGHT

Table 1: Block definitions of the DXF-header file *sample_head.dxf*

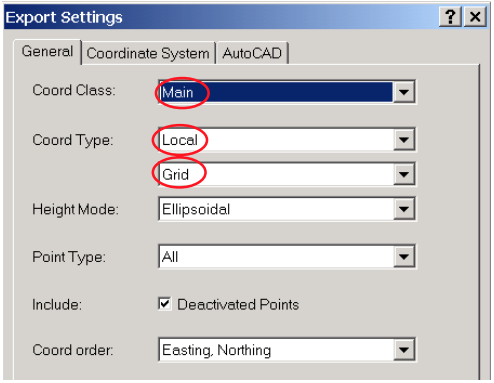
➢ When all the Codes are matched click **OK** to confirm.

The following dialog appears again:



➢Click the **Settings** button.

The following Property sheet appears:



➢Change Coord. Class to **Main**. The coordinate triplets of the highest class will be exported.

➢Make sure the **Coord Type** is set to **Local** and **Grid**.

➢To continue, click on the **Coordinate System** tab.

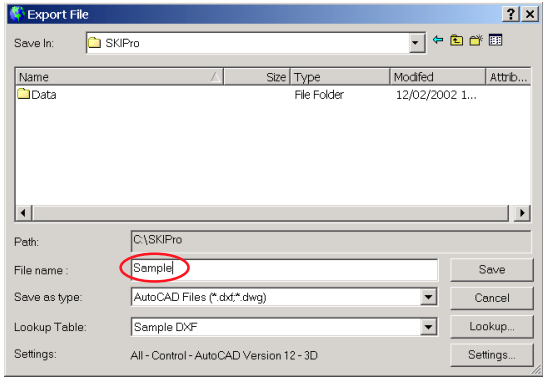
➢Make sure the **Coordinate System *Sample RT*** is selected.

➢To continue, click on the **AutoCAD** tab. Ensure that the **Format** is set to **DXF** as this is the ASCII format which is supported by most GIS/CAD packages.

The remaining settings do not matter for this exercise.

➢Click on **OK** to close the Settings property page.

The following dialog appears once again:



➢ Enter a **File name** and ensure the correct path. The extension *.DXF will be added automatically.

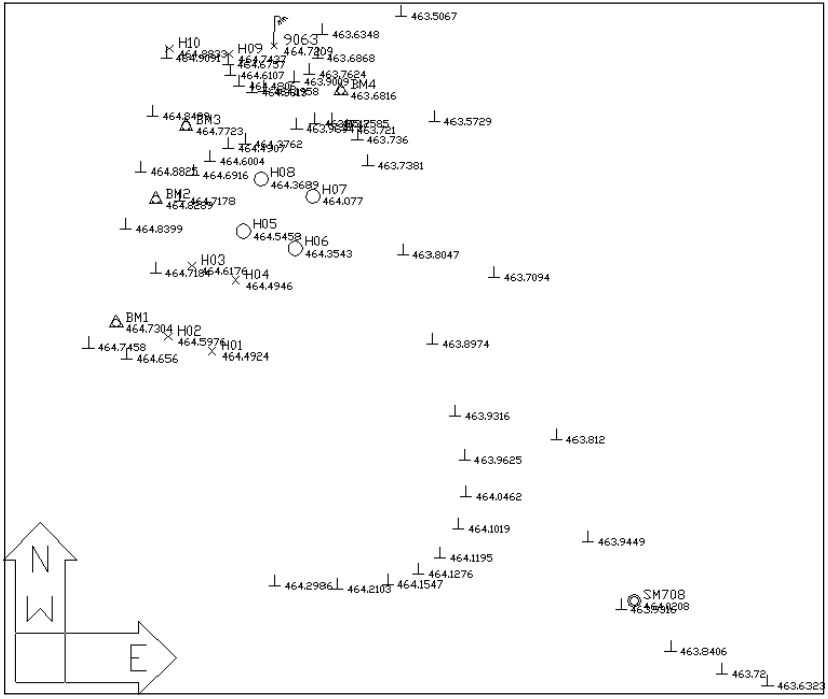
and finally,

➢ Click **Save** to export the file.

Congratulations !

You have successfully created a GIS/CAD file in DXF-format.

You can now import the file into your GIS/CAD package. It should then look as follows:



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Our commitment to total customer satisfaction

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